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Monthly Message

General von Clausewitz stated: "War is to be regarded as an organic whole from which the single branches are not to be separated and in which, therefore, every individual activity flows into the whole."

In commenting upon this Strausz-Hupé[1] says: "Hot or cold, nuclear or 'conventional,' war is still war." And again further in the same paragraph: "Soviet communism, as Lenin left it and as it operates today, is a system set up to carry on world-wide conflict, and its astonishing success is due, more than to anything else, to the fact that the Communists have always considered conflict (war) as an 'organic whole'—and the Western democracies have not."

As one reviews the history of the Soviet Defense Ministry at the present time the structure of the armed forces appears as a unit in a single powerful Ministry of Defense. But, on the other hand, during World War II the Army and Navy were separate; then combined for four years, then separate again for three. With the new order under the present government, the pendulum has swung back to strong unification under strong Party control although the political commissars are much downgraded. The medical departments are under what is called the Administration of the "Rear Services."

Since the death of Stalin, however, a far more realistic approach has been adopted with intense development of military and scientific technology. In 1956 Major General Pokrovsky[2] stated: ". . .Contemporary military affairs are completely dissimilar to what they were in the period of the Great Fatherland War, 1941-1945, or to what they were in recent times in military operations in Korea. Therefore, at the present time the practical experience of the wars of the past can be regarded only as important historical landmarks of the past, and not as an unchanging dogma determining military affairs of today and tomorrow."

And so the medical departments of our own services must not only maintain plans for former conventional types of warfare, but must attempt to look ahead in planning for types of warfare of which we can but dimly envision at the moment and yet which may be devastating in their extent.

Frank B. Berry

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Assistant Secretary of Defense
(Health and Medical)

1. Strausz-Hupé, R.: Nuclear Blackmail and Limited War. *Yale Rev.* Winter 1959.
2. Garthoff, R. L.: *Soviet Strategy in the Nuclear Age.* F. A. Praeger, N. Y., 1958.

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Foreword

The *United States Armed Forces Medical Journal* is the medium for disseminating information of administrative and professional interest to all medical personnel of the Department of Defense. The Assistant Secretary of Defense (Health and Medical) and the Surgeons General of the several services invite all medical officers, dental officers, Medical Service Corps officers, Nurse Corps officers, and officers of the Veterinary Corps of the Armed Forces, and the medical consultants of the Army, Navy, and Air Force to submit manuscripts for publication in this *Journal.*

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UNITED STATES ARMED FORCES
MEDICAL JOURNAL

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INTRAPULMONARY AIR TRAPPING IN SUBMARINE ESCAPE TRAINING CASUALTIES

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ALTHOUGH fatalities have occurred at a rate of less than one in 10,000 ascents, serious accidents during submarine escape training are distressing, and every effort must be exerted for their prevention and treatment.[1,2]

Knowing how to escape from a confined space at depth has both a practical and psychologic value to the members of the submarine service. Moreover, an understanding of the submarine environment and the stresses that it can exert upon living beings is vividly imparted in a practical way during the training. Escape training also is a valuable screening device confronting candidates for the submarine service with a situation that involves real stress. This program, therefore, has been considered of critical importance, despite the hazards.

The equipment used in providing this experience at the U. S. Naval Submarine Base, New London, Conn., has been illustrated.[3] Briefly, access to the 100-foot, water-filled tower is by means of air locks at various levels. After indoctrination in the physiologic principles, the trainees are given the experience of ascending from successive depths under direct and close supervision of instructors. One of the chief problems is to teach the men not to hold their breath during the ascent, but to exhale at a rate adequate to prevent overpressure in the lungs, without too great

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a loss of buoyancy. The pressure in the locks is that of the water at the level where the ascent begins. If the breath were held during ascent, the gases would expand as the ambient pressure diminished. There exists, therefore, the possibility of overexpansion of lung tissue with dissecting emphysema and air embolism. Several methods have been employed to reduce these hazards:

1. Maintenance of ventilation with respiratory equipment, the "Momsen lung."

2. Adequate controlled exhalation during free ascent: It is with this method that maintenance of buoyancy is of importance.

3. Exhalation before beginning the rise to the surface, which is assisted by a buoyant object. The last and most foolproof technic, referred to colloquially as the "blow-and-go" method, is currently in use in New London.

Air embolism must be distinguished from decompression sickness with which it was at first confused.[4] The latter depends on the solution of gases in body fluids and tissues at high pressures, with a release into the gaseous state as the ambient pressure is reduced. In the escape training procedure, the exposure to the elevated pressure in the air locks is usually so brief that there is little danger of sufficient solution of gases to give rise to decompression sickness. Although nascent gases can act as emboli, the term "air embolism" is, by custom, restricted to the effects of gases introduced into vessels from without.

In the fatalities actually investigated, air embolism has indeed appeared to be the mechanism of death.[3,4] Review of the actual events preceding the fatal outcome has indicated that in some instances the doctrine of the particular escape method was being faithfully followed by the men involved. This has suggested the possibility of involuntary air trapping in the lungs. Actual evidence of the existence of such a process has not, however, been forthcoming hitherto. This report deals with observations on two young trainees in whom there was concrete evidence of local air trapping with attendant complications.

CASE REPORTS

Case 1. This 23-year-old man died following his third ascent in the training tank on 2 April 1957. He was a brawny, strapping man, 5 feet 11 inches tall, and weighing 212 pounds. He was said not to have been ill for some time previously. The most recent respiratory infection had occurred one year ago. The first ascent had been from an 18-foot depth and the second from 50 feet, the third 12 to 14 minutes after the second. The buoyant-assisted escape procedure (method number 3) was used and followed correctly in all three episodes, and there was no undue delay under pressure before the ascent was made. As the man reached the surface, he made an attempt to climb out of the tank, but apparently suddenly lost consciousness. He was carried from the tank and placed in the decompression chamber at the top of the tower within 30 seconds.

During compression, he was observed to gasp four or five times. There was still a detectable heart beat when 165 feet equivalent pressure had been reached. The pressure was then carried to 220 feet, but no heart beat was then heard. Decompression to sea level was carried out over a period of approximately five hours.

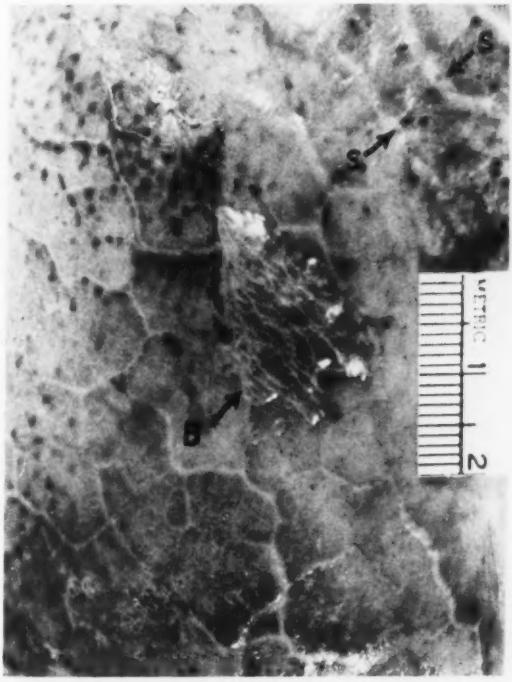

Figure 1. Anterior aspect of the right middle lobe, showing blebs (B) *produced by dissecting air in the pleura. Bubbles of gas also are visible in the larger interlobar septums* (S).

Necropsy findings. The necropsy was performed by the method of Kohn.[5] Only pertinent observations will be mentioned. The skin was reflected with care from a small area of the thoracic cage anteriorly, so as to form a well which was filled with water. With the first incision of the skin, numerous bubbles of gas were seen to exude from the small cutaneous vessels. As the left pleura was incised, there was a hissing sound, but it was not clear whether air was entering or escaping from the thorax on this side. The chamber created by the reflected skin and then the entire thorax was continuously kept full of water. When the right pleural cavity was entered, about 50 ml of air in the form of large bubbles escaped. The pericardial sac also was found to contain a small quantity of gas. Trapped bubbles were seen in the properi-cardial fat pad which was adherent to the anterior surface of the left

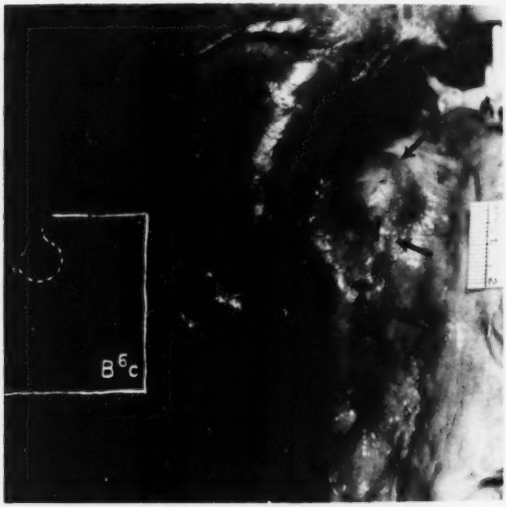

Figure 2. Posterior view of left lung and mediastinum: The borders of a large calcified lymph node (N) *are indicated by arrows. The approximate position of the bronchолith and surrounding lesion (as shown on section in figure 6) is indicated by a dotted circle. Actually, this lesion is in the depths of the lateral subsegment of the superior segment close to the interlobar fissure. The outlines of this subsegment* (B^6c) *are indicated by the solid lines.*

Figure 3. A section of the left lower lobe through the superior segment at the level of origin of the lateral ramus of the superior segmental bronchus (B^6c). *This bronchus has a thickened mucous membrane which narrows its lumen. It is adherent on its medial aspect to a calcified lymph node* (N). *The histologic section corresponding to this view is shown in figure 4.*

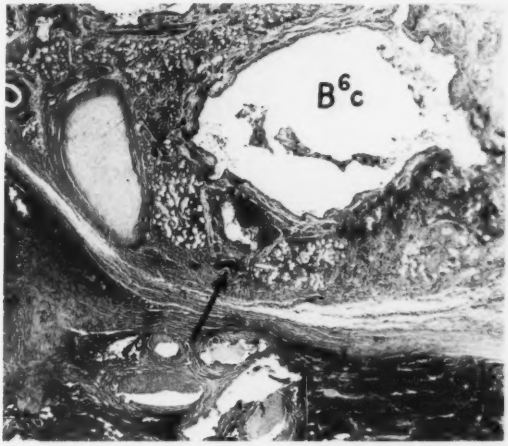

Figure 4. Microscopic section corresponding to figure 3. The bronchus (B^6c) has a thickened mucous membrane infiltrated with lymphocytes. Numerous sharp-edged calcific spicules are in the adjacent lymph node, which is adherent by dense fibrous connective tissue to the bronchus (at the arrow). This connective tissue penetrates partly into the wall of the bronchus. A spicule of calcific material probably penetrated into the lumen in the direction of the arrow, to become lodged in the more distal branch illustrated in figure 6.

Figure 5. Higher magnification to demonstrate the structure of the B^6c bronchus shown in figure 3, to indicate possible region of penetration of the broncholith in the direction of the arrow. The bronchus here is thickened by a heavy infiltrate of lymphocytes throughout all coats. A space in the wall may represent a sinus tract.

lung, and also in the subserosa of the posterior pericardium, especially where this membrane reflected upon the great pulmonary veins. Numerous gas bubbles were discerned in the coronary arteries and veins. Large quantities of gas were found within the right atrium and within the aorta, both of which also were opened under the water seal. The aorta actually contained very little blood. No free air was found in the peritoneal sac, which also was opened under water.

The surfaces of both lungs *in situ* were found to be elevated in many places by bubbles, the outer walls of which consisted of the very thin transparent reflection of the parietal pleura. Minimal hemorrhage was observed in the loose tissues among these bubbles. Gas bubbles also were prominent in the septums (fig. 1). As the pulmonary ligaments were approached, the hilar regions were found to contain large quantities of interstitial gas, especially on the left side. An actual rupture of the pleura associated with hemorrhage was found at the junction of the anterior surface of the right lower lobe and the pulmonary ligament. Loose fibrous adhesions obliterated three quarters of the interlobar fissure on the left side. These and the visceral pleura of the fissure were enormously distended with gas (fig. 9), much more so than the tissues elsewhere. Gas bubbles also were in the mediastinal reflection of the pleura and in the mediastinum itself (fig. 10). The lungs and mediastinal structures were removed *en bloc*. They were then fixed by intratracheal insufflation of Brady solution (a modified Kaiserling) and suspended in a large vat of the fixative.

Following three days of fixation, a mechanism for air trapping produced by a broncholith of tuberculous origin was revealed. On the posterior aspect of the left main bronchus, just laterally of the aortic arch, there was a somewhat irregularly calcific mass, measuring 2½ by 1¾ by 1½ cm, having the appearance of calcified tuberculous lymph nodes (fig. 2). The trachea was opened posteriorly and the incision continued into the left main bronchus, which was not compressed nor otherwise involved by the nodes just described. A second partly calcified node was discovered in the region of the superior segment. This node was in firm adherence to the lateral ramus of the superior segmental bronchus (designated B^6c by Boyden[6]) which appeared to be more rigid, thicker, and narrower than usual (fig. 3). The pleura overlying this subsegment was somewhat thickened and more opaque and white than elsewhere, suggesting the presence of a lesion within it (fig. 2). Parallel incisions were now made at close intervals, proceeding laterally to approach the pleural scar. A mulberry-shaped calcified broncholith with diameters of approximately 3 by 4 mm was found within the B^6c bronchus (fig. 6). Despite the rough surface of the broncholith, it lay in a smooth-walled, slight expansion of the bronchus. The most remarkable feature was the overexpanded state of the bronchioles and smaller air spaces in the tissue distal to the obstructed bronchus. This entire focus of emphysema and bronchiolectasis was less than 2 cm in its largest diameter. Immediately adjacent were the adhesions in the left interlobar fissure where the dissecting emphysema was most massive (fig. 9).

The remainder of the left lung and the entire right lung were dissected in a manner similar to that just described, but no overexpanded air spaces of the type seen in the left superior segment were encountered. The septums and the loose tissue embedding the broncho-arterial rays, especially the former, everywhere contained interstitial gas.

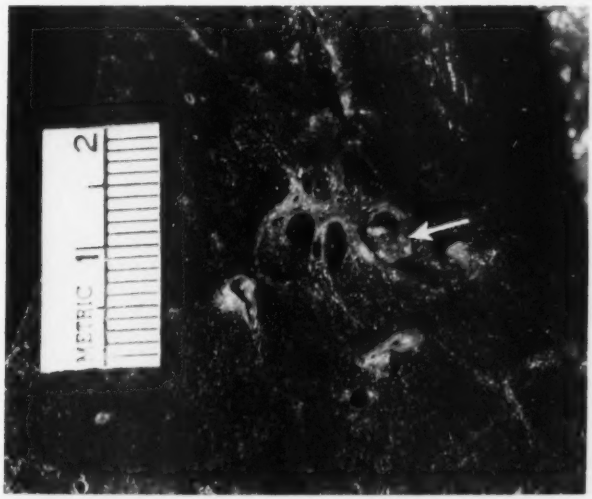

Figure 6. Calcified broncholith (arrow) lodged in a branch of the B^{6}c bronchus. The level of section is distal (lateral and anterior) to that of figure 3. Surrounding the partly obstructed bronchus are other air passages with bronchiolectasis and bullous emphysema, which are illustrated histologically in figure 7 and 8. The broncholith probably acted as a ball-valve to result in air trapping. The adhesions between the upper lobe (LUL) *and the lower lobe have been lysed. These were remarkably dissected with gas, as shown in figure 9.*

In the node adherent to B^{6}c were seen histologically numerous sharp-edged calcific spicules which were embedded in hyaline connective tissue. Scar tissue penetrated into the bronchus within which there was a small sinus tract. The wall of this tract was particularly heavily infiltrated with lymphocytes. It was probably through this region that the actual passage of the broncholith occurred (figs. 4 and 5). The walls of related distal air spaces also were thickened by fibrosis and with an interstitial exudate consisting predominantly of lymphocytes. Some of the alveoli in this region which were widely distended seemed to have ruptured in their thinner portions, particularly where they abutted upon a vein lying in a septum at the border of the lobule (fig. 7). This septum and the adventitial and outer medial coats of the veins were dissected by irregular spaces within which were torn remnants of collagen, a lesion interpreted to correspond with the grossly evident interstitial emphysema. In one such space there were remnants of extra-

B
V
S
B6c

vasated erythrocytes. No actual tear in this major vessel was seen in the sections examined.

The heart weighed 415 grams. The presence of gas bubbles in the coronary arteries and veins was described when these vessels were first viewed *in situ* under water. There was negligible atherosclerosis and no evidence of previous damage to the myocardium. The valves of the patent foramen ovale had not fused, although they overlapped widely. Both arteries and veins of the dura, pia-arachnoid, and brain were found to be filled with bubbles of gas (fig. 11). Opening of the skull under water was considered superfluous since the ascending aorta had been found full of gas when it was opened beneath the aqueous seal. When multiple transections were made, the cortex and medulla were found to be sharply distinguished in the anterior portions of the brain. In the parietal and occipital region and especially near the inferior horns of the lateral ventricles, however, the white and gray matter were seen to be transformed (fig. 12). Here the white matter particularly was extremely soft, dull, and opaque and of spongy texture. Minute zones of softening and fragmentation also were found in parts of the spinal cord and in the pons, medulla, and cerebellum. No hemorrhages were seen grossly in any level of section. Microscopically, there was generalized congestion of cerebral vessels, especially of capillaries. Occasionally in the gray and especially in the white matter there were perivascular hemorrhages. In many places, cells about the vessels were pushed away, resulting in perivascular spaces empty of cellular elements. These changes were probably the result of post-mortem dissection of gases.

Interpretation of these observations is somewhat complicated by (1) the fact that this man was reported to have taken several gasping respirations while being compressed in the chamber to 165 feet, with subsequent decompression; and (2) patency of the foramen ovale. It nevertheless is clear that interstitial emphysema and gas embolism must have developed during life. Their apparent magnitude under atmospheric pressure may, however, have been modified by the attempt to control the phenomenon in the pressure chamber; that is, some of the bubbles may have expanded by a factor as great as 5 upon decompression, presuming that some of them had been formed at depth. Since the patient had not been exposed to pressure for a sufficient interval of time during life, it is doubtful that any significant amount of nitrogen had been dissolved in the blood to be released later.

The possibility of fat embolism was considered,[7] but no fat emboli were found in "flaming red" stains of the lung and brain.

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Figure 7. A section made at approximately the level shown in figure 6. There is heavy predominantly lymphocytic infiltration of the B^6c bronchus and of smaller branches near it, with extension into the interalveolar septums beyond. Many of these are thickened by granulation tissue supporting these cells and are small and lined by cuboidal cells. Others are remarkably emphysematous and thin interalveolar septa have ruptured, particularly near the septum (S). *The latter contains a large vein* (V), *the wall of which contains blebs* (B) *of interstitially dissecting gases. Other blebs are found in the septum.*

In the present instance, the probable sequence of events may be reconstructed as follows: The patient had suffered first-infection tuberculosis with extension to a bronchial lymph node in the superior segment of the left lower lobe, and to a hilar node overlying the left main bronchus. The lesions had become caseated and then had undergone calcification. A calcific spicule had penetrated through the capsule of the node and through the wall of a subsegmental branch of the superior segmental bronchus (B^6c) of the left lower lobe, and had then become lodged more peripherally as a broncholith. This broncholith functioned as a ball-valve with air trapping, obstructive emphysema, and organiz-

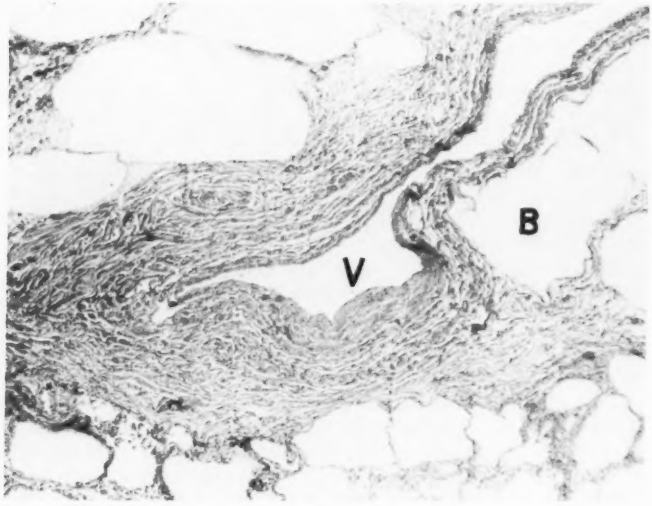

Figure 8. Higher magnification of vein (V) *shown in figure 7, but at a different level. Interstitially dissecting gas bubbles* (B) *in the septum that encloses the vein. The gas has dissected the adventitia and media of the vein near the upper right corner of the photograph.*

ing interstitial pneumonitis distally. During the descent in the training tank, air had been trapped under pressure behind the broncholith. This air had expanded during the subsequent ascents, possibly in several episodes, ultimately to reach the critical pressure for dissection. Dissection then took place into the pulmonary veins. The origin of the dissection in the region distal to the broncholith is suggested by the fact that the interstitial emphysema was most extensive in the tissues of the immediately adjacent interlobar fissure which had become partly obliterated by adhesions.

Several explanations for the presence of the very widespread interstitial emphysema in the contralateral lung must be considered: 1. Dissection from the local site along the fascial planes

of the septa as they imbed the veins and along the broncho-arterial rays to the opposite side transmediastinally. 2. Focal compressive effects upon distant bronchi of dissecting air originating in the local site. Such bronchi themselves could then function to trap air, with further dissection. 3. Bronchospasm induced during the development of the spreading interstitial emphysema. 4. Independent origin of the interstitial emphysema in multiple foci remote from the manifest obstruction. The first represents the most direct and likely route.

It is noteworthy that relatively more gas was found in the aorta and arteries than in the veins, suggesting the pulmonary venous ingress of gas from one side of the heart to the other.

The striking changes in the central nervous system are considered to be largely the result of post-mortem expansion of air trapped within minute vessels intracranially under pressure while the patient was still breathing in the compression chamber, with subsequent expansion upon decompression of the body. If this had been an ante-mortem process, emboli of fat, or even cerebral substance, would be expected in the pulmonary vessels. These were sought, but none were found.

Several roentgenograms of the thorax were reviewed for correlation with the findings at post mortem. In all of these, the major calcific shadows were clearly demonstrable (fig. 13). One, visible against the fifth intercostal space posteriorly, undoubtedly represents the nodes in the region of the left main bronchus; the second, smaller mass, situated in relation to the sixth intercostal space posteriorly, is interpreted to represent the calcific deposits in the node among the branches of the superior segmental bronchus of the lower lobe. The broncholith itself cannot be discerned with certainty. These films were reviewed independently by several experienced radiologists who arrived at this interpretation without knowledge of the actual necropsy observations.

Case 2. This 21-year-old sailor had successfully completed an ascent from a depth of 18 feet, at approximately 1000 hours on 26 February 1957. Fifteen minutes later he made a second ascent from a depth of 50 feet. Again there was no observed or expressed difficulty. He was noted to exhale properly during the entire 50-foot ascent. Nothing untoward was observed until he was asked to climb out of the water, at which time he hesitated on the ladder. Immediately thereafter, he fell unconscious. He was at once placed in a compression chamber at the top of the tower. Pressure was applied rapidly for about 45 seconds to reach the equivalent of a depth of 140 feet of sea water. There was a delay at this step for about 4 minutes prior to further compression to the equivalent of 165 feet, the usual pressure for treatment. This delay was the result of misreading of one of the pressure gages. During the period of applying pressure, the patient was unconscious and generally flaccid, except for his hands and arms, which were in a state of moderate tonic flexion. Deep tendon reflexes were absent. There were no convulsive movements.

Approximately one minute after reaching 140 feet, the patient began to move his legs spontaneously. In another minute, he responded suffi-

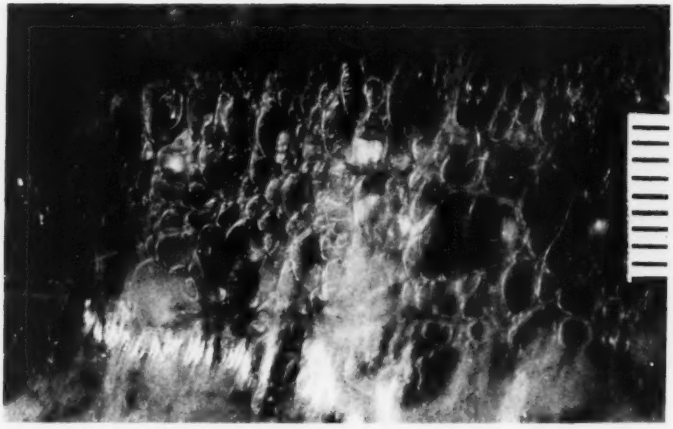

Figure 9. Remarkable dissection of air within the adhesions that had partly obliterated the left interlobar fissure in the near vicinity of the ball-valve lesion demonstrated in figure 6. This represents the most extensive interstitial emphysema that was encountered during examination of the lung, and is evidence suggesting the probable initiation of dissection behind the ball-valve lesion.

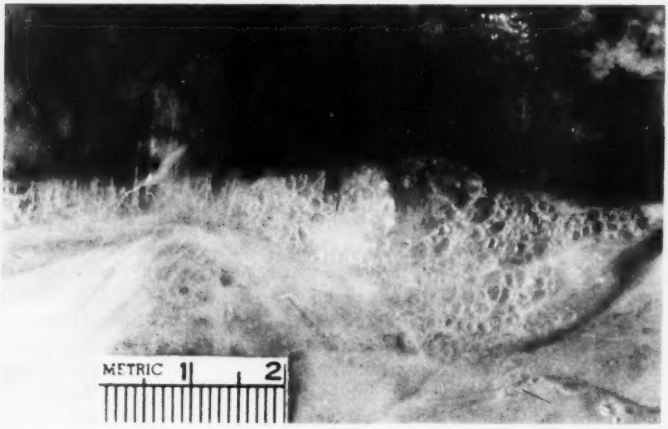

Figure 10. Interstitial emphysema involving the mediastinum as the parietal pleura that covers the latter is reflected as visceral pleura upon the posterior aspect of the right lung (RL).

ciently to test the strength of his upper and lower extremities. The left arm was completely paralyzed and there was marked weakness of the right arm. Both lower extremities were markedly weak. Mentally, he was confused and disorganized during this period and for several minutes following.

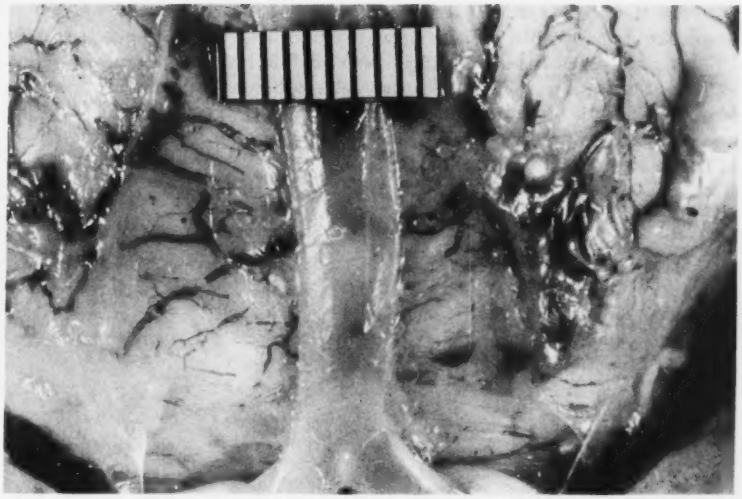

Figure 11. Basal surface of pons. Innumerable bubbles are seen in the arteries and veins. The basilar artery is collapsed. This brain was embalmed through the carotid arteries before removal. The aorta was found to be full of gas when opened under water. It was, therefore, considered superfluous to attempt removal of the brain under water.

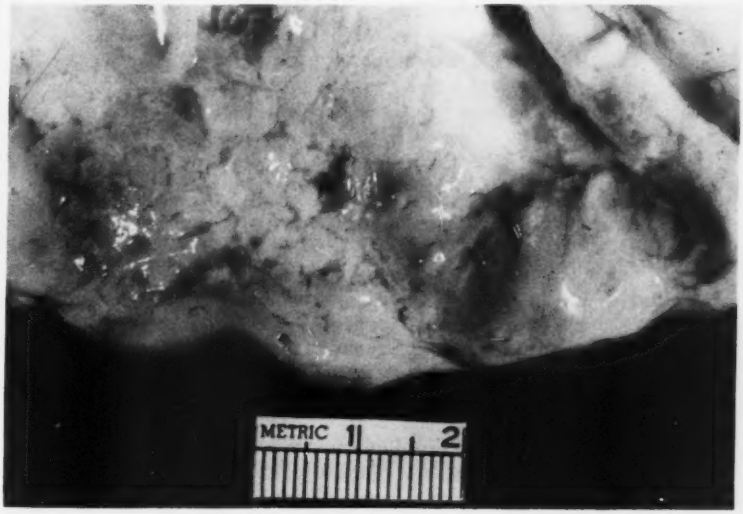

Figure 12. Right temporal lobe. Delimitation of the gray matter is vague. Both white and gray matter are remarkably soft. This change is considered to be the result of expansion of contained gases upon decompression after death.

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A depth of 165 feet was reached at 1025 hours. He was placed on Naval Treatment Table Number 4, which involves gradual decompression. The actual schedule followed is recorded below. After reaching 165 feet, he remained confused, despite being able to identify his location and responding to questions concerning events immediately prior to leaving the 50-foot lock. At 1038 hours his lower extremities had regained full strength, although deep tendon reflexes remained depressed. About this time, he clutched the left lower anterior part of his chest, but denied that he had any pain. When asked to inhale deeply, however, he grimaced, as if in great distress. It must be emphasized that, during the first several hours of treatment, the patient was confused and did not respond to questions in a completely logical way. A detailed examination of his chest was made at 1040 hours, during which he started to expectorate frothy sanguineous sputum. There was no apparent dyspnea. Percussion revealed striking tympany over the entire left anterior part of his chest, but most marked in the region of the cardiac apex. Local and tactile fremitus were decreased on the left, and breath sounds were absent, except for the apical region of the lung. There was no apparent shift of the trachea or mediastinum to the right, although the cardiac outline could not be percussed. It was the impression of the examiner at that time that the patient had a massive pneumothorax on the left with an estimated 75-80 per cent atelectasis. The posterior part of the chest was not examined at this time because apparent severe pain on movement of the patient, and fear on the part of the examiner that gross movements might increase pneumothorax.

Examination at 1047 hours revealed that all deep tendon reflexes had returned and had become slightly hyperactive. At approximately 1055 hours all objective weakness had disappeared, but the patient was unable to sit up because of discomfort in the chest and "dizziness." Examination at 1106 hours revealed a questionable sensation of crepitus in the right anterior aspect of the neck just superior to the clavicle and extending upward 3 to 4 centimeters.

The patient was kept at a simulated depth of 165 feet for a total of 75 minutes, at the end of which time he was taken to a depth of 140 feet for 30 minutes. Thereafter, he was maintained successively at depths of 120, 100, and 80 feet over 30-minute intervals. During this period, he improved in all respects. He became mentally clearer although, in the opinion of the examiner, he did not become mentally alert until toward the end of treatment, approximately 24 hours later. In general, the physical findings in the left side of the chest became progressively less marked. The tympany decreased and the apparent zone of the involvement shifted toward the lower portion of the left anterior chest. The patient was carefully examined periodically from the standpoint of pulmonary and neurological findings and an especially detailed examination was made immediately prior to and following each reduction of pressure. During a total period of six hours at a 60-foot depth, the physical findings continued to improve and, with the decrease in the size of the zone of tympany, there was an accompanying return of breath sounds and tactile and vocal fremitus. It was

then the impression of the examiner that there was an involvement of only 30 to 35 per cent of the total estimated volume of the thorax. On reaching the 50-foot depth, re-examination revealed that there was apparent re-expansion of the gas trapped in the left part of the chest. This was estimated to represent an increase to about 40 to 50 per cent involvement. He remained at 50 feet for another period of six hours,

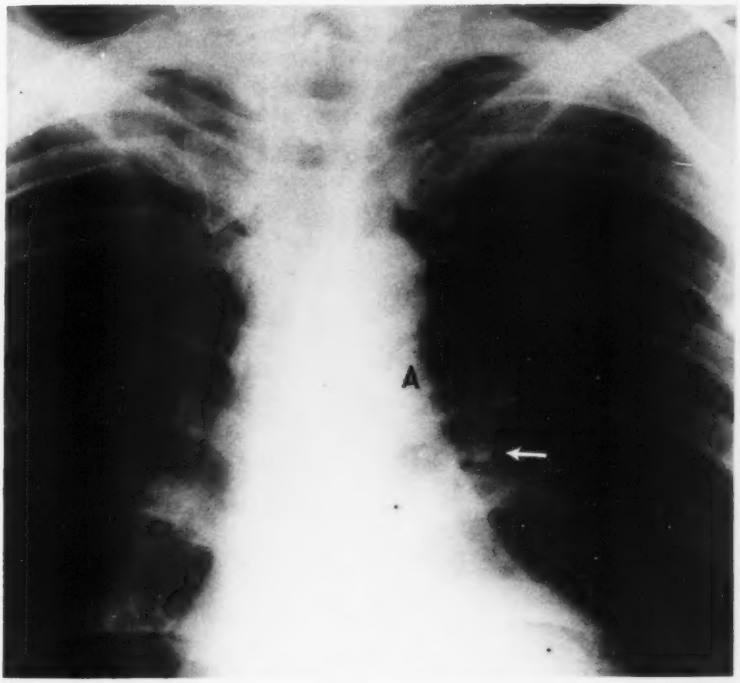

Figure 13. A routine roentgenogram of the chest made on 3 February 1956, about one year before death, shows the large calcific density (A) just beneath the aortic knob, corresponding to the mass of calcific nodes illustrated in figure 2. In the interspace below and more laterally projected is another calcific density, probably corresponding to the nodes illustrated in figure 3.

during which time the gas volume decreased to 20 to 25 per cent. This sequence of events is indicated diagrammatically in correlation with the responsible lesion demonstrated after the patient was decompressed (figs. 14 and 15). Again, after being released from 50 feet and arriving at 40 feet equivalent depth, there was a re-expansion of approximately 10 per cent of the total estimated volume of the chest. The patient remained at 40 feet for six hours, and the same sequence of re-expansion and subsequent contraction repeated itself on moving to 30 feet. He was kept at 30 feet for a period of 12 hours, during which time signs of the presence of extraneous air within the chest cavity became questionable. He was taken to 20 feet for two hours, then to 10 feet

for two hours, reaching the surface at 2346 hours on 27 February. The patient and the medical officer in attendance had been under pressure for a total of 37 hours and 27 minutes.

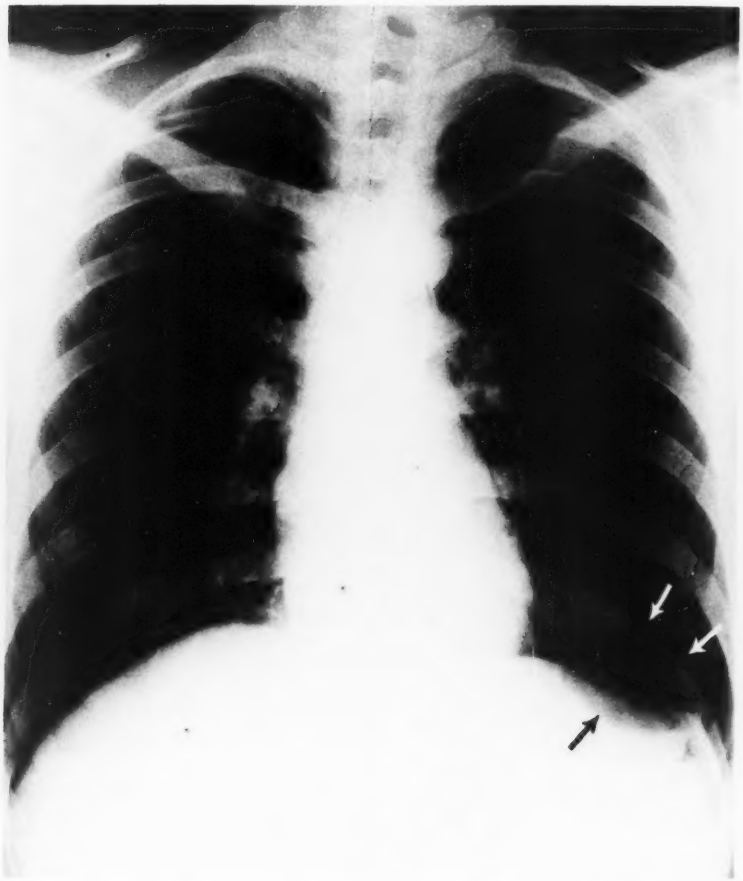

Figure 14. Sharply outlined ovoid bulla (arrows) demonstrated in relation to the left diaphragm which appears to be locally depressed thereby. The roentgenogram was made just after completing decompression.

Approximately 20 minutes after reaching the surface, a roentgenogram was taken of the patient's chest. An elliptical, thin-walled, cystic structure, measuring 7 by 4.5 cm, was demonstrated in the anterior portion of the left lower lobe. It lay just above the dome of the diaphragm and appeared to depress it slightly. Subsequently, it was established that this lesion had not been evident in a previous roentgenogram. It was now evident that the explanation for the physical findings observed while the patient was in the compression chamber lay in the enor-

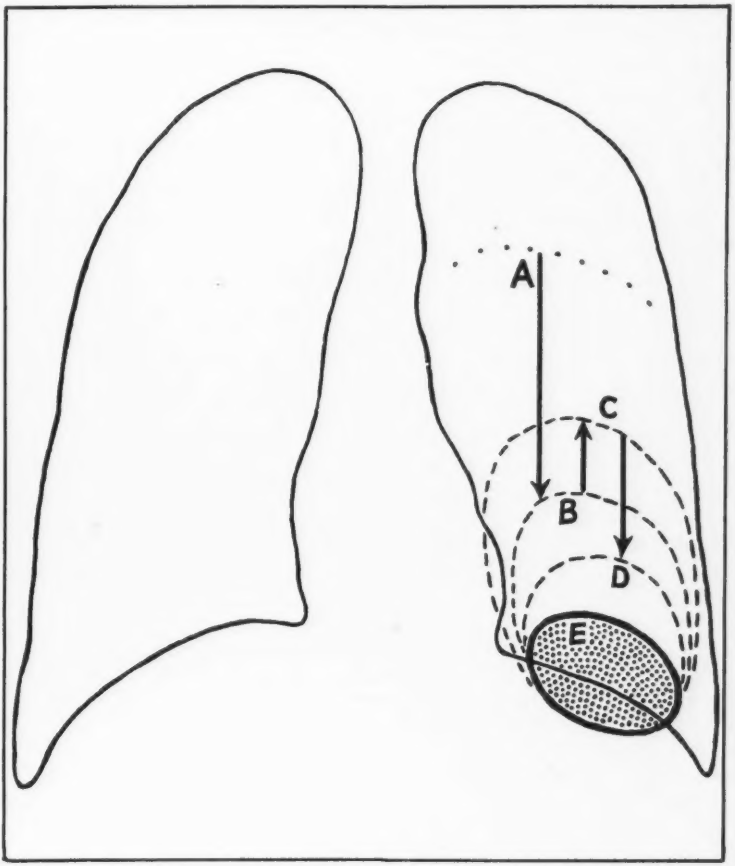

Figure 15. Diagram representing clinical impressions of volume changes in emphysematous bulla in which air trapping had occurred. Dotted outline at (A) *represents apparent size of zone of tympany at 1040 hours, about 20 minutes after recompression had been started. The bulla tended to become smaller, but several episodes of partial re-expansion were noted upon lowering the pressure in the tank. Thus, after six hours at 60 feet equivalent depth, the bulla is represented by outline* (B), *but immediately after decompressing the patient to 50 feet, it expanded to correspond with outline* (C), *then gradually shrank to a size represented by outline* (D). *Two similar episodes were noted upon two further successive decompressive steps, to 40 and 30 feet, respectively. The final size of the bulla just after the patient was removed from the tank is indicated at (E), which corresponds to the roentgenogram reproduced as figure 14.*

mous expansion of a bulla which gradually diminished in size except for temporary re-expansion after each step in the decompression (figs. 14 through 17). The post-decompression roentgenogram also revealed a moderate mediastinal emphysema (fig. 17). There was no evidence of fluid in either pleural space.

Roentgenograms of the chest were repeated 36 hours later. By this time, the cystic lesion apparently had shrunk to a very small zone of irregularly decreased density surrounded by an increased density, measuring roughly 1.5 cm in its greatest diameter (fig. 18). Mediastinal emphysema had by now completely disappeared. In the film made one week later there was no longer any definite evidence of an emphysematous bulla (fig. 19).

In discussion with the patient following his complete mental recovery, he related that, during the final 50-foot ascent, he felt as if he were "running out of air" approximately halfway to the surface. Almost simultaneously, he had a sensation as if someone had struck a hard blow to the left lower anterior part of his chest (a standard training signal to exhale rapidly). All instructors, however, subsequently denied having touched him during his ascent.

After his recovery, the patient was sent to the pulmonary function section of the Hospital of the University of Pennsylvania. Studies conducted there on 20 March by Drs. DuBois and Johnson[18] did not reveal any significant volume of "trapped gas," nor was there any evidence of generalized emphysema. The data obtained are summarized in table 1.

DISCUSSION

It obviously is not to be expected that a ball-valve lesion such as that of the first patient will be easily demonstrable anatomically in every case. The general principle of air trapping under pressure behind a partly obstructed bronchus supplying a relatively small portion of pulmonary tissue, but resulting in widespread interstitial emphysema and air embolism, is nevertheless demonstrated. Obstructive mechanisms undoubtedly exist, at least in the late phases of some types of pulmonary emphysema. For example, in the common centrilobular form, flap-valve mechanisms apparently are at work, especially during the expiratory phase.[8-12] The valving can result from loss of tractional support of bronchioles as alveoli are destroyed in the interstitial pneumonitis that often precedes "obstructive emphysema" (fig. 20). The presence of such lesions may obviously dispose to complications when air is trapped under high pressures attending ascent from depth. Even a rigid bronchostenosis of sufficient degree will predispose to air trapping if equilibrium with high air pressures at depth is reached, and the surface is rapidly approached thereafter. Before equilibrium with normal atmospheric pressure can take place there may be sufficient local overpressure to produce serious complications. Broncho-obstructive lesions also can be of a transient and reversible nature, such as those

produced by exudate or mucus in the bronchi, or possibly by bronchospasm. Identification and interpretation of such factors is obviously a matter beset by difficulty and uncertainty. The search for organic obstructive lesions remains a challenge to the best efforts of experienced investigators.

Pioneer experimental studies of the complications of air trapping upon ascent from depth were made by Behnke[13] and Polak and Adams[14] more than 25 years ago. More recent observations,

TABLE 1. *Studies of pulmonary function* in case 2*

Test	Normal	Patient	
LUNG VOLUMES			
			Per cent of normal
Inspiratory capacity	3120 ml	3700 ml	118
Expir. reserve vol.	1560 ml	1800 ml	115
Vital capacity	4680 ml	5490 ml	117
Residual volume	1170 ml	1890 ml	161
Total lung capacity	5850 ml	7380 ml	126
Res. vol./total cap.	< 30 %	25.4 %	
F.R.C. (open circuit)	2730 ml	3690 ml	135
F.R.C. (pneumatometric)	2730	3430 ml	126
DISTRIBUTION OF INSPIRED GAS AND BLOOD			
			On air
Alv. gas uniformity (% N, incr. 750-1250 ml)	< 2.0 %		1.5,0.8,0.6
N, elim. rate (% N, after 7' O_2)	< 2.5 %		< 2.5
MECHANICS OF BREATHING			
			Before bronchodilator
Max. Expir. flow rate (200-1200 cc.)	400-600 L/min.		398
Max. Inspir. flow rate (200-1200 cc.)	300-500 L/min.		302
Airway resistance	0.5-1.5 cmH,O/L/sec.		139

*Observations by Drs. Arthur B. DuBois and Robert L. Johnson,[18] University Hospital and Graduate School of Medicine, University of Pennsylvania.
F.R.C. = Function residual capacity.

stimulated by the need to understand the submarine escape casualties better, have established that, in normal dogs, the development of air embolism is not dependent on the absolute pressure within the air passages, but rather on a "transpulmonic" pressure in excess of 60 to 70 mm Hg, or a "transatrial" pressure in excess of 55 to 65 mm Hg.[15] The former is defined as the difference between intrapulmonic and intrapleural pressure and reflects the stress placed upon the lung tissues. The latter is the pressure gradient between the air passages and left atrium, and as

Figure 16. Lateral view of thorax, demonstrating outline of the bulla and local depression of diaphragm (arrows).

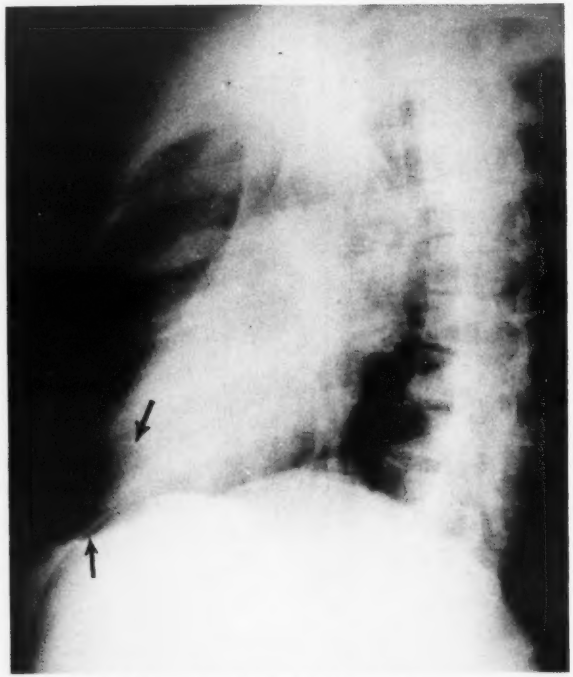

Figure 17. Oblique view immediately after decompression. The outline of the bulla is now projected forward (arrows). There is evidence of interstitial emphysema in the anterior mediastinum.

Figure 16. Lateral view of thorax, demonstrating outline of the bulla and local depression of diaphragm (arrows).

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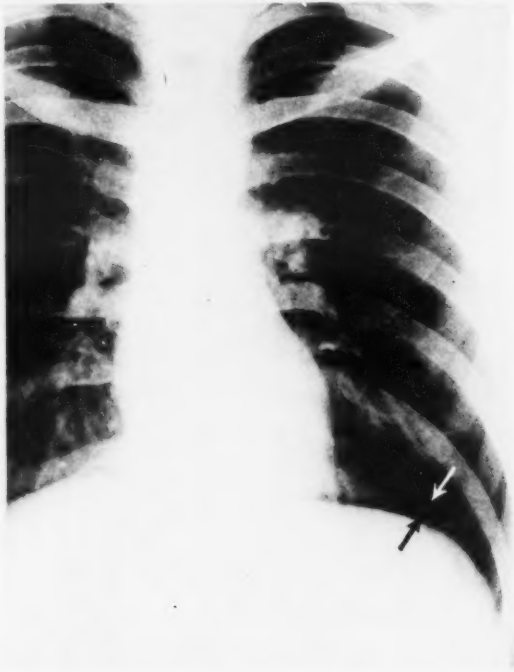

Figure 18. Suggestive outline of bulla, now shrunken to a small size (arrows). Dome of the diaphragm no longer depressed.

Figure 19. The roentgenogram of 14 March, approximately two weeks after decompression. There is now no sign of the bulla nor of other abnormalities.

such represents the force impelling transfer of bubbles to the pulmonary veins once rupture of tissue has occurred. Thus it has direct relevance to the problem of air embolism. It is worthy of note that these pressure gradients increase more steeply within the last 25 feet of the surface during a rapid ascent from 200 or 100 feet.

That the air embolism occurs by way of the pulmonary veins is suggested by the invariable presence of gas in bubble traps placed in the carotid arteries, while the jugular bubble traps sometimes remain empty when air embolism occurs under experimental conditions of rapid decompression from depth with the trachea closed.[15]

It is possible that lesser transatrial pressure gradients might be effective in producing air embolism when overpressure occurs in portions of lungs previously diseased, as in case 1. Definitive evidence on this point is, however, not available.

In the case of a localized zone of overpressure associated with an overdistension of part of a lung, the transpulmonic pressure (difference between intrapulmonic and intrapleural pressure) in this zone will increase strongly, while other parts of the lungs can be expected to show no significant change. When the *local* transpulmonic pressure reaches a critical level massive dissection of air and even fatal air embolism could result. When released into the alveolar tissue in one part of the lung, air can follow planes of dissection into the other lung as well as into the mediastinum and neck. Such pathways have been traced in the first of the two patients in the present group.

Effects of local overpressure on pulmonary or systemic circulation have not as yet been studied. When air is trapped at high pressure throughout both lungs, there is pulmonary arterial hypertension and a fall in cardiac output and in systemic arterial pressure, while the systemic venous pressure may rise considerably. Factors responsible for untoward symptoms and death are more difficult to identify when air trapping is localized. Later, as interstitial emphysema and "air block" come to involve both lungs, the pulmonary veins may become compressed and the lungs are made more rigid, with the appropriate physiologic effects that have been well discussed by the Macklins.[16]

When air embolism has occurred, the best available treatment appears to be rapid recompression.[3,17] To this end, an appropriate compression chamber has been placed at the top of the training tower in New London, and this was put into use in both cases discussed in this report. Previously, it was necessary to bring casualties to the foot of the tower by elevator, which caused a very undesirable delay, as well as the necessity of transportation.

The important problem remains of how to prevent injury and death during escape maneuvers. The "blow-and-go" method seems most likely to ensure against voluntary breath holding from care-

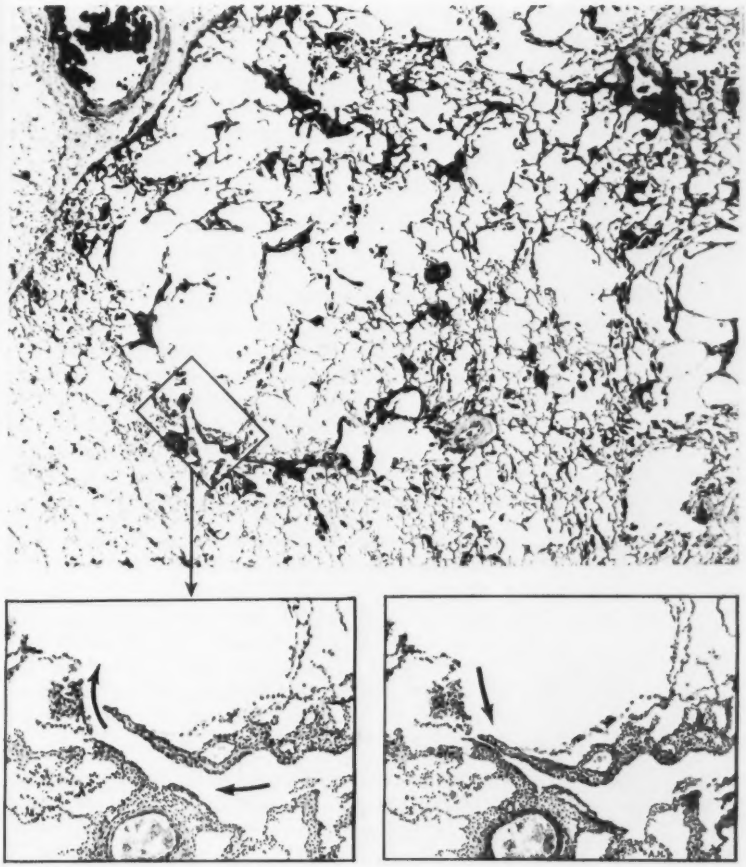

Figure 20. Upper: Photograph[12] of pulmonary lesion in centrilobular emphysema. Walls of alveoli that formerly exerted tractional support on the wall of the bronchiole have disappeared. The bronchiole can admit air during inspiration, as indicated in the photograph and sketch (lower left). In the expiratory phase (right lower), however, the bronchiole collapses and air is trapped.

lessness or panic. A method, therefore, is needed for the detection and elimination from submarine escape training of persons prone to involuntary air trapping. Several categories of such persons should be considered:

1. Those with pulmonary emphysema of the obstructive type. The difficulty is that even early focal lesions may lead to serious consequences under the extreme stress of ascent from depth. Failure to demonstrate by functional tests the existence of the phenomenon of air trapping in case 2 shows the necessity for an improvement of methods used for the measurement of trapped air.

2. Those with pulmonary calcifications in whom broncholiths may exist. This could conceivably lead to the unnecessary disqualification of many otherwise suitable persons, but might save a few from the hazards of air embolism. The matter must await the judgment of further experience.

3. Persons with other chronic respiratory diseases.

SUMMARY AND CONCLUSIONS

In two casualties of submarine escape training, who suffered interstitial emphysema and air embolism, there was evidence of intrapulmonary air trapping which was involuntary. In the fatal case, a broncholith of tuberculous origin acted as a ball-valve within a subsegmental bronchus. In the other patient, who survived, the mechanism of the bronchial obstruction was not apparent, but a large bulla was demonstrated roentgenographically after decompression. This was almost entirely absorbed within 36 hours of the patient's return to atmospheric pressure.

The problem of detecting persons liable to suffer involuntary air trapping when breathing air at supra-atmospheric pressure and subjected to the stress of rapid decompression is of major importance. Individuals with obstructive emphysema, with significant pulmonary calcification, or with evidence of chronic respiratory disease represent poor risks. As exemplified in the second patient, even careful roentgenographic and physiologic studies may, however, fail to demonstrate air trapping under ordinary atmospheric pressure, with methods now available.

Facilities for rapid recompression should be available because at present this method offers the only means of therapy, the efficacy of which has been attested under practical conditions.

Studies of submarine escape training casualties and their management should be of interest to civilian physicians, because of the popularity of "skin diving" with self-contained underwater breathing apparatus where the hazards are similar.

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PSYCHOLOGICAL STUDY AT AN ANTARCTIC IGY STATION

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THIRTY-NINE Americans, participating in the International Geophysical Year (IGY) research program, recently spent twelve months at an isolated Antarctic station. This report presents a brief psychological study of their activities and interrelations.

The group of 5 officers, 9 civilians and 25 enlisted men at this IGY station was more isolated from outside contacts than those at any of the other six American IGY stations at Antarctica. Because of the long distance, weather, and landing conditions, access to the station by air was difficult if not impossible. Surface travel over the ice to other U. S. stations was out of the question. Only an occasional visitor arrived from United Kingdom and Argentine stations during the 12-month period until about three weeks before the party left the ice, when the relief ship arrived which carried the authors as passengers. The authors were members of a three-man team comprised of two psychiatrists and one psychologist ordered to the Antarctic to conduct the survey that would pursue three principal objectives: (1) to determine the effectiveness of the Navy Medical Corps' screening program through which the personnel of this station had been processed prior to their departure to the Antarctic a year before; (2) to study group and individual reactions occurring under conditions of comparative isolation and enforced close personal association continuing for 12 months in an IGY station; and (3) to make recommendations for improving screening procedures and to make practical recommendations bearing on group morale for future expeditions to that area.

METHOD OF OBTAINING DATA

Each of the 39 members of the "wintering-over" party was questioned by one or, in some cases, by two or all the team members in individual interviews. Each interview lasted from one to several hours. Twelve interviews were tape-recorded. Forty-six specific questions and areas of inquiry were explored

From U. S. Naval Hospital, Philadelphia, Pa.

in each interview. Several weeks of close association with the group, both on the ice and during the trip back to the United States, many informal contacts, conversations, and observations helped to correct distortions due to biased reporting and to fill out and sharpen the picture. Somewhat contrary to our expectations, no member refused to be interviewed or tape-recorded. As was to be expected, there was a mild xenophobia but this was evanescent. In general, there was a high order of co-operation with the study team and much good will and frankness. This co-operativeness was attributed in part to the eagerness of a group of isolated individuals to communicate their story to fresh and sympathetic auditors and, in part, we believe to our own careful approach. One of us flew into the station by helicopter several hours before the ship drew alongside the ice. We talked with many of the party about our objectives and methods and published what we assumed was a disarming announcement in the mess hall. We pointed out that we came as scientists, that we were interested in the reactions in both the individual and the group to conditions at an IGY station, so that we might with the help of everyone make some suggestions for the improvement of conditions for future expeditions. We emphasized that co-operation with us was entirely voluntary and that we would respect any reticences a member might entertain.

FINDINGS

Screening of personnel conducted by teams* of psychologists and psychiatrists prior to the departure of the expedition from the United States was not unsuccessful. We were not able to make positive conclusions because, without comparing our results with nonselected "wintering-over" groups, it is always possible that the screening was irrelevant and that the results would have been the same without these selection efforts.

No psychosis, disabling depressive states, obvious psychosomatic illness, or clear-cut neurosis developed at this station. In other words, no member of the party was unable to perform his duties because he had developed a clinically recognizable psychiatric condition. In point of fact, the general health at this station was so good that absence from duty for any medical cause whatever was a rarity.

A few clear-cut, presumably characteristic personality disorders were observed but these did not interfere with the ability of the men to carry out their assigned duties. One man was not only markedly schizoid and withdrawn (he insisted on living and sleeping in his working area away from his associates and would

*The original screening of all personnel for the seven U. S. IGY stations had been conducted by teams of psychiatrists and psychologists at ten U. S. naval hospitals and at Davisville, R. I.

rarely vouchsafe a conversational word), but he was also universally regarded as one of the more capable and valuable members of the party.

Two or three individuals, however, might well have been eliminated as unsuitable, not because they developed any emotional illness that was a source of distress to them or prevented them from carrying out the physical requirements of their duties, but because of personality characteristics that were a frequent source of annoyance, irritation, and tension within the group.

Among the characteristics that appeared to augur well for good group adjustment and acceptance were tolerance for the weaknesses of others, capacity for a balanced appraisal of a situation, discretion, an inclination toward hard work, technical competence, and an ability to use leisure time enjoyably either alone or with others. The dour individual alluded to above had many of these qualities.

On the other hand, as might be expected, characteristics that were notably a source of distress to the group included a penchant for contentiousness, overt antiauthoritarian trends, undue sensitivity about the matter of rights and privileges, a need to take immediate aggressive action in response to grievances, fancied or real, and above all, sloth. To put the matter quite simply, a man could be highly individualistic, unconventional, or even eccentric and still be accepted and acceptable, provided that he worked hard and well and did not "bother" anyone otherwise.

Group Responses

Group-leader tension. A crucial factor in understanding the dynamics of this particular group was the existence of an antithetical attitude between the leader of the station and the remainder of the group. This attitude arose partly because the leader, a highly able explorer in civilian life, who had been ordered to active duty for this assignment, had little experience in military leadership and was somewhat inflexible in his interpersonal dealings; and partly because the leader provided a convenient and plausible focus for the hostilities that are inevitably generated in a group of men whose interests and backgrounds are disparate and who are thrown together under conditions of enforced close personal associations for a long period of time. Paradoxically, there was good evidence that this group-leader tension had a salutary influence on the group as a whole.

Cohesiveness. The group managed to achieve a certain cohesiveness and a marked reduction of internally generated tensions, in part, by virtue of their identical feeling toward the common source of aggrievement, the leader. As evidence of lack of overt or disruptive internal hostilities is the remarkable fact that only one, rather abortive physical fight was documented. Violent,

angry arguments were practically nonexistent among these 39 men thrown together in intimate relationship for 12 months with a liberal supply of beer available to all hands. Another possible additional reason for the absence of overtly expressed hostility was the recognition on the part of each member that he was dependent on the good will of the "next man" in this "tight little world" for his own vital feelings of acceptance, security, and worth, and that overtly expressed antagonisms represented too much risk when other sources of gratification of these needs were not available.

Basic objectives of mission. Despite the generally critical attitude toward the policies and practices of the leader, among civilians and officer and enlisted personnel, there was general, albeit, often reluctant agreement that the basic objectives of the mission of the station were realized and in some ways exceeded.

Subgroup expectancies. One other source of group dissatisfaction appeared to have its origin in the failure of realization of certain subgroup expectancies. For example, the enlisted group phantasied a democratic Utopia relatively free of discipline and with an equal sharing of both chores and amenities, while the civilians apparently envisaged an academic cloister free of "military interference" and the distraction of extracurricular duties These expectancies were the result of such factors as rather ambiguous briefings before departure from the United States and to wishful thinking.

Disappointment and disillusionment. One curious source of disappointment and disillusionment that affected an appreciable number of the younger or more romantically inclined members was the relative luxury of living conditions and the comparative absence of excitement, danger, and real hardship. This spoiled the whole adventure for them.

"Stress" of isolation. The "stress" of comparative isolation was not troublesome in itself for the group as a whole. Nostalgia was not an important factor. There were several reasons for this. (1) These men were all volunteers. (2) Except for the air support group during the winter months, all members were quite busy. (3) Although no mail could be sent or received, there was frequent contact with other antarctic stations and the outside world through the station's official short-wave radio. More importantly, personnel had some contact with their families and friends through the ham radio station that had been set up at the station primarily for the personal use of the members. (4) Many men indicated that their acceptance of the fact that there was no possibility of release from their situation for a year helped them to adjust to the fact of isolation.

Boredom. Except during the winter season for some of the aviation group (who could not fly because of the weather con-

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ditions), boredom was apparently not an important problem, if one can credit the majority statement. Except for the air support group in the non-flying months, most men had enough work, and various recreational facilities and equipment were available. The scientific group particularly was busy and interested. Despite their differences with the command, and despite the existence within their group of an individualistic, eccentric, provocative, and strikingly unkempt individual (one of the few that eluded formal screening) the morale of this subgroup was of a fairly high order. This was attributed in part to the busy preoccupation with activities of a high special interest to them. Their somewhat maverick member was tolerated and accepted because of his technical competence, capacity for hard work, and because of the "united we stand" philosophy.

Cold. Cold did not represent a stress of any significance to the adjustment problems of the group, except insofar as it limited outside activities. The camp interiors were efficiently heated.

Insomnia. Insomnia was quite widespread during the early weeks of the winter season of 24-hour darkness, the so-called "big eye," and seemed related in part to reduced physical activity and increased resting during the day. It is probably significant that insomnia was more prevalent among the air support group which was the least active of the total group during the winter season. On the other hand, insomnia was not especially troublesome during the summer when the days were 24 hours bright.

Food. As might be expected, "oral needs" were enhanced because of the absence of other basic gratifications. Appetite and consumption were enormous. Weight gains up to 20 and 30 pounds were not unusual and slight pot bellies on otherwise slender young men were notable. Fortunately, the cook was competent, imaginative, and very anxious to please. His prestige was enormous.

"Psychosomatic" complaints. "Psychosomatic" complaints were infrequent with headaches being the most common. Of the 9 civilians and 4 officers, 6 complained of fairly frequent headaches while of 21 enlisted men whose records were available for review, only three complained of this symptom. The increased incidence of headache under polar conditions has been noted by others and ascribed to the effects of cold. At this station, however, the affected scientific group were no more exposed to cold than the majority of the enlisted group. It is well known that headaches are often a reflection of carefully controlled negative feelings. It is possible that the more sophisticated headache group felt the need for more complete repression of their hostilities.

Anxiety and hysteria. Discussion with the base medical officer and review of his sick-call book for the year revealed no evidence of anxiety attacks or hysterical symptoms during the year (unless

the mild fugue-like states described below could be so designated). There were no suicidal attempts and, insofar as our information goes, no suicidal ruminations.

Memory and concentration. A considerable number (about one-third) indicated that they experienced rather marked and unwonted difficulty with memory or concentration. Usually this was noted only after several months on the ice. Usually the difficulty was referred to as a form of absent-mindedness, wandering of attention, or inattentiveness. In two cases, however, the difficulty was fairly extreme and took the form of mild fugue states. The individual would recall leaving his quarters, but nothing thereafter, until he "came to" moments later in some other part of the camp wondering how he got to that area and why he was there. One or two members were reported as demonstrating a marked degree of preoccupation and inattentiveness during conversations with another member that was irritating and puzzling. This impairment of memory, alertness, or awareness was a rather striking phenomenon and requires more study.

Sex. The following findings are based largely on what we were told by the men. No one seemed resentful of questioning along these lines. A few were embarrassed, however, and stated that they preferred not to discuss this area in which case, of course, the matter was not pressed. It is axiomatic that no area of human functioning is more subject to distorted reporting, exaggeration, suppression, and repression than the area of sex. Nonetheless, we feel that these generalizations may have some validity.

Isolation from women was not in itself a serious problem for the group or for any individual in the group, with the possible exception of one member who displayed excessively strong erotic yearnings during a brief period of personal emotional stress. Pin-up pictures were described by the majority to have existed in larger amounts than ordinarily observed in comparable stateside stations. To us, the amount of and interest in pin-up activities seemed almost extreme. Sex dreams, nocturnal emission, and masturbation showed variable frequency relationships: (1) a slight general tendency to increased frequency; (2) increased frequency more apparent during periods of inactivity and personal emotional stress and toward the end of the tour; reawakened phantasies are questioned here; (3) a rather less than usual frequency among the scientific group who were no older, on the average, than the rest of the station members and who were among the busiest and the most preoccupied. There was no evidence of any overt homosexual practice, scandal, or gossip although, as might be expected, there seemed to be some indications of mild covert manifestations throughout the group.

Of particular interest to the observers was a documented split of an organizational subgroup into two cliques toward the end

of the wintering-over year. Following this split, members in each clique refused to speak to members of the other clique except when absolutely necessary in the course of duty. Although in daily close proximity with each other, this behavior existed for three months prior to the arrival of the relief ship, and it persisted to a lesser degree on the return voyage home.

THE CODE OF THE MEDICAL PROFESSION

It is a curious fact that members of the medical profession have never had full control over their own fates. Our hospitals, our medical schools, our public health activities, and our conditions of practice are influenced to a great extent by others. At one time, it was strongly argued that the question of vaccination against smallpox was a matter for religion to decide, not the doctors. Even today, efforts are being made by certain segments of our population to direct the destinies of the medical profession. It is my earnest hope that the medical profession will emerge from this defensive position—certainly not to exalt the profession—but to develop concrete, decisive, positive health and scientific programs under full realization of the morals of medicine as written in the Hippocratic Oath. No other profession has ever attempted to live under such a moral code.—Gunnar Gundersen: World Peace Through Medicine. *Journal of the Medical Association of Georgia,* October 1958.

BLOWFLY MYIASIS IN MAN

Report of Two Cases

MILTON B. FLEMINGS, *Major, MSC, USA*

MYIASIS, or the invasion by fly larvae of the tissues and organs of man or animals, occurs more frequently in warmer climates than in colder ones. The incidence of this disease may be correlated with the existing level of sanitation, the density of the prevailing fly population, and the economic status of the individual. Myiasis of the nose, mouth, ears, eyes, anal region, vagina, bladder, urinary passages, and gastrointestinal tract, as well as the creeping furuncular types of dermal and subdermal myiasis may be caused by over one hundred different species of fly larvae.[1-6]

Myiasis in man is not commonly reported from the northeastern region of the United States. A search of the literature revealed about 19 published articles reporting cases of myiasis in man throughout the entire United States during the past ten years.[7-25] One case was reported from Maryland.[16] A case of nasal myiasis occurred in Arlington County, Va.[26]

Two new cases of myiasis (wound and intestinal) in man are reported by military service dispensaries located in the states of New York and Massachusetts. One case represents a reinfestation. Although myiasis in man due to blowflies is commonly recognized, these two cases are reported because the possibility of fly larval infestation in these days of ordinarily strict aseptical practices of modern medicine is not frequently observed by practitioners. Also considered is the possibility that this phenomenon may be more prevalent in this region of the country than is commonly recognized.

CASE REPORTS

Case 1. The patient was an 82-year-old retired soldier who had been hospitalized repeatedly for control of peripheral edema and recurrent hydrothorax. He lived upstate New York in a modern and properly screened house where flies were rarely present. He was known to have had arteriosclerotic heart disease for at least eight years without any specifically proven myocardial infarction or hypertension. For the past four years, persistent edema of the feet was present. He also

From First U. S. Army Medical Laboratory, 90 Church Street, New York 7, N. Y.

had symptoms of partial prostatic obstruction over the past seven years with enlargement of the prostate, and a clinical suspicion of carcinoma of the prostate which was never histologically proved. He gave a history of alcoholic intake for 50 years and was thought to have Laennec's cirrhosis. For the past two years, he had been hospitalized repeatedly for treatment of persistent pedal edema and recurrent pleural effusions. None of the latter were cytologically positive.

The patient was seen at a military outpatient clinic, during June 1958, for a paronychia of the right great toe which had developed following a contusion. The infection was treated with topical antibiotics each week for several weeks. On 17 July, maggots were noted in the draining lesion, and 30 to 40 were removed and sent to this laboratory, where they were determined to be *Phaenicia* species, second-instar larvae. Treatment consisted of daily clean dressings; and although the wound did not completely heal, it was noted to be free of maggots on subsequent weekly examinations.

On 22 September, the patient was admitted to the hospital for gangrene of the right great toe, which was related to the previous purulent infection and blowfly infestation. Physical examination showed 4 plus edema of the feet and gangrene of the right great toe. Two weeks after entering the hospital, it was noted that the same lesion was again infested with maggots, of which 20 to 30 were removed and sent to this laboratory where they were determined to be *Callitroga macellaria* (Fabricius), third-instar larvae. Treatment was supportive and consisted of repeated clean dressings.

Cellulitis developed subsequently and an amputation above the knee of the right leg was performed on 6 December 1958.

Case 2. On 9 July 1958, a 10-month-old male infant was seen in the outpatient clinic of a military service dispensary located in Massachusetts. The mother had observed "worms" in the infant's stool while changing soiled diapers on the morning of the clinic visit. The stool specimen contained only two live maggots, which this laboratory found to be *Phaenicia sericata* (Meigen), third-instar larvae. Prior stools were uncertain, since they were not checked. No specific gastrointestinal symptoms were elicited, although it was stated that the child was eating poorly and slept a maximum of seven hours per night. The child had been known to eat dirt and leaves while playing in his yard. The family resided on the military reservation, and the child's travel had been limited to the immediate community. Prior to this clinic visit, the child had been in good health with the exception of one upper respiratory infection occurring in April 1958, from which he recovered without complication.

Physical examination revealed an alert and happy child, with a rectal temperature of 99.4°F. No remarkable physical findings were encountered on examination of the head, chest, heart, and abdomen. Laboratory findings showed a white blood cell count of 7,650 per μl, with a differential count of 17 neutrophils, 75 lymphocytes, 5 monocytes, 2 eosinophils, and 1 basophil. The hematocrit was 37 ml per 100 ml.

No specific therapeutic agents were given, but the mother was provided with preventive instructions. The child was seen again one month later, on 9 August, at which time he was entirely asymptomatic, and no more maggots were detected by multiple, thorough, stool examinations during the interval period.

COMMENT ON BLOWFLY SPECIES

Significant habits and biology of the blowfly species involved are presented.

Phaenicia sericata (Meigen) is saprophagous, and is commonly known in its larval stage to attack diseased tissues and open wounds of man or lower animals. It is less commonly known to invade the gastrointestinal tract, but is particularly attracted to "foul smelling" wounds and carrion.[2,4] The female adult depos-

Figure 1. Third instar larva of Phaenicia sericata *(Meigen).* (× 25)

its eggs in a mass on or near the wound. The incubation period is from 8 to 42 hours.[2,4,27] The larvae undergo three molts, having a feeding period of 1½ to 9½ days, depending upon the prevailing temperature and humidity. Warm weather decreases the incubation period and the stages between molts. The young larvae normally feed near the wound surface, but older larvae may bore deeply into healthy tissue. This particular species has been noted for its ability to remove necrotic tissue from pus-discharging wounds. In fact, it is the species most commonly used in wound therapy.[2-6] The larva is characterized by: a cylindrical shape that tapers toward one end; a deep cream color with a pinkish or purple tinge; very small spines; pear-shaped posterior spiracles of which the peritremes are thin with long thin slits; and the larval length, which is approximately 14 mm at maturity (fig. 1). The adult, commonly known as the green-bottle blowfly, is metallic-green

bodied with yellowish or coppery reflections. There are geographic distribution records of this species throughout North America, occurring frequently in collections from the northern United States and southern Canada. However, only two cases of human myiasis due to this species have been reported from the United States during the past 10 years.[21,22]

Callitroga macellaria (Fabricius) in the larval stage is primarily a scavenger and is found abundantly in carrion. In cases of myiasis, it is a secondary invader which will feed upon necrotic tissue and has no definite pattern of migration when active in or about the wound. This species is abundant in southern United States, occurring throughout the year, but is seldom abundant in the northern region, appearing about June and disappearing about September, although a few may be found as late as November first.[2-6] Egg deposits and incubation period are similar to that of *Phaenicia sericata*. The larvae undergo three molts, reaching maturity within 6 to 20 days, depending on the prevailing temperature and humidity.[2-6]

Figure 2. Third instar larva of Callitroga macellaria *(Fabricius). (× 25)*

The larva is characterized by: a cylindrical shape that tapers toward one end (typical of muscoid maggots); a creamish white color; encircled bands of spines on the segments; a nonpigmented tracheal trunk leading from the posterior spiracles; and the length of the larva, which is about 17 mm at maturity (fig. 2). The adult, commonly known as the "secondary screwworm fly," is green bodied with a predominantly orange colored head and black longitudinal stripes on the dorsum of the thorax.[2-6] James[4] stated that many previous records of this species producing wound myiasis in man were undoubtedly erroneous; that another species of the same genus, *Callitroga americana* (Cushing and Patton), probably should have been incriminated.

DISCUSSION

Although the patient described in case 1 lived in a low "fly-producing" area and in a home having reasonably high sanitary standards, reinfestation occurred while outpatient treatment con-

tinued. Kilpatrick and Quarterman[28] stated that well-screened houses of similar status are only 97 per cent effective against flies entering the buildings. The following is quoted from Micks and Calma:

Several authors including Taylor (1950), have suggested that the patient should be guarded against reinfestation by other flies while the primary case is being treated. They offer no evidence that this has ever occurred and we have been unable to find any report of a reinfestation while the primary attack is still undergoing therapy. The extent to which immunity might function in preventing a second attack of human myiasis is not clear. Borgstrom (1938), however, has found that a single infestation of *C. americana* in guinea pigs produces a temporary, local immunity lasting between 20 and 40 days after the primary infestation. The immune response was found to be of a local character, largely confined to the specific area infested.[17]

Oral ingestion of blowfly eggs or larvae with contaminated food or water and subsequent larval development in the intestinal tract is usually the source of intestinal myiasis;[3,6,29] however, such is questionable in case 2 because of the lack of commonly associated symptoms, including intestinal disturbances. Contamination of the stool specimen is ruled out inasmuch as the patient's mother discovered live maggots soon after defecation. The possibility that maggots may have entered the rectum by accidental exposure and passed as mature larvae was not eliminated.

Several authors have attempted to disprove the possibility of infestation of the human digestive tract by common fly larvae, based on the premises (1) that the active, normally free-living larvae cannot survive the relatively anerobic conditions existing in the human digestive tract, and (2) that the mechanical movements of the tract and the action of the digestive juices would destroy the larvae even if they could obtain sufficient oxygen.[3,28] Other authors have noted that the fly larvae were able to live and mature in the human intestinal tract.[3,30]

SUMMARY

Two new cases of myiasis (wound and intestinal) in man are reported from the northeastern part of the United States, an area from which no case has been reported during the past 10 years. The case of wound myiasis resulted from infestation of *Phaencia* species larvae and then reinfestation with larvae of *Callitroga macellaria*. The case of intestinal myiasis was caused by invasion of *Phaenicia sericata* larvae. Both patients lived in properly screened homes.

In these days of ordinarily strict aseptical practices of modern medicine, it is possible that cases of infestation in man by larvae or ova of the blowfly may not be diagnosed by practitioners. That

this phenomenon may be more prevalent in this region of the country than is commonly recognized is also probable.

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THE SURGICAL RESIDENT

Surgery, whatever the surgeon is called or how ever he is paid, is a pursuit for mature people. It cannot be carried out by boys regardless of how adept they may be at remembering, recalling and writing examinations. Maturation takes time and cannot be speeded up by changing the name of the first postgraduate year from internship to assistant residency or by abolishing the last year of college. These are "on paper" administrative devices. Some solution other than the speedup method will have to be found, one which recognizes the stature of a resident and his contribution to human welfare. Much of the present-day talk of the increasing time it takes to learn to be a surgeon is specious. It has always taken time. . . If anything, residency training as we now know it shortens the time. The present-day archaic attitude that residency training is a period of life in which services are given by the trainee in repayment for teaching is faulty. A career in surgery is an intellectual adventure from the beginning and is not an economic progression.—John H. Mulholland: Learning To Be A Surgeon. *Annals of Surgery,* September 1958.

AN INTRAORAL PHOTOGRAPHIC APPARATUS FOR PERSONNEL IDENTIFICATION

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RECORDED dental findings have been used by civilian and military authorities as an aid to personnel identification. Without these data, identification of the dead is often difficult. There are many occasions when fingerprints, body scars, and other physical characteristics may not be available to the investigator. In the absence of a dental record, bodies that have been badly burned, immersed, mutilated, or decomposed may be almost impossible to identify. As Wyckoff[1] pointed out, personal identification by means of the teeth through recorded dental findings is certain and positive because of their relative indestructability, the resistance to deterioration of the restorative materials used, and the unlikelihood of identical dentitions.

It is obvious then that, for positive identification, the dental record should be completed with scrupulous accuracy. The present system for recording intraoral findings on a dental chart, however, introduces the possibility of human error. During charting procedures, the examining dental officer and the recording assistant could make an error in their notations. The relative value of an erroneous dental record would then be questionable.

The dental chart is limited in describing the actual pictorial anatomy, anomalies, and lesions of the oral cavity. Accurate details regarding tooth and arch form, palatal height, extent of malocclusions, gingival recession, mottled enamel, hypoplasia, supernumerary teeth, restorations of unusual design, and appliances that would be of value in confirming an identification can be listed on the dental record only as being present.

Recognizing the necessity for an improved method of recording these findings, Taylor and Schlack[2] began a study to determine the feasibility of using intraoral color photography as a means for personnel identification. A brief summary of their work follows.

An apparatus was designed and constructed at this institute to photograph the anatomic structures of the oral cavity in color. Three individual photographs were taken of each patient on 35 mm Kodachrome. The oral structures were photographed from the

From U. S. Naval Medical Research Institute, Bethesda, Maryland.

reflections of a front-surface, intraoral, metal mouth mirror. The first exposure recorded the details of the occlusal surfaces of the mandibular teeth, and the maxillary arch was photographed on the second exposure. The third and final exposure recorded the labial and buccal surfaces of the maxillary and mandibular teeth in occlusion. A unique code recorded the individual's serial number, age, sex, race, state of birth, and years of service on each picture. After successful field testing, the applicability of this apparatus and method was reported.[3] Certain improvements suggested by that report were responsible for the construction of a new photographic unit.

CURRENT APPARATUS

The new apparatus,[4] was designed and constructed at this institute, and is similar in principle to the unit produced by Taylor and Schlack.[2] The basic unit consists of a fixed focus, 35-mm camera with synchronized flash shutter, an electronic stroboscopic light to illuminate the interior of the mouth, and a removable front-surface metal mouth mirror attached to a reversible frame.

Three exposures are made of each subject. In the first view, the labial and buccal surfaces of the maxillary and mandibular teeth in occlusion are photographed from an anterior position. Cheek retractors separate the lips and the head is supported by a chin rest. In the second exposure, the upper lip, palate, and the occlusal surfaces of the maxillary teeth are photographed from the reflecting surface of a front surface mirror. For the third exposure the mirror is reversed and the lower lip, tongue, and the occlusal and buccal surfaces of the mandibular teeth are recorded. Identification data in code, containing the patient's name, date of photograph, branch of service, serial number, age, years of service, sex, race, and place (state) of birth appear in each photograph.

The camera and stroboscopic unit portion is a product of the Knebel Camera Company, Rochester, New York. The camera consists essentially of an Eastman 35 body to which a Wollensak 75 mm color corrected lens was adapted. Exceptional depth of field is obtained by stopping the diaphragm down to *f* 45. The illumination source consists of a General Electric electronic multiflash tube energized by an accompanying power pack. All other structures included in the apparatus were made in the machine shop of this institute. Details of the new apparatus are provided in line drawings accompanying the research report.[4]

INTRAORAL PHOTOGRAPHS

Although the armamentarium is quite simple, certain preparations are necessary to assure that the apparatus can be operated in an efficient manner. All mouth mirrors should be steam sterilized and the equipment assembled before the patients begin to pass through for processing. From the results of field tests held

at the U. S. Naval Training Station, Bainbridge, Maryland, it was determined that these preparations should be started about 30 minutes before the arrival of the first group of subjects.

The efficiency of the intraoral photographic technic will be limited primarily by the adeptness of the operators. Detailed instructions for the use of the apparatus can be obtained from the research report.[4]

Because the camera operates on a fixed focus principle, the dimensions of the field of view remain constant. It is important, therefore, that the operators familiarize themselves with these dimensions. The shape of the field is rectangular, measuring 2½ inches in height by 3¾ inches in width. These dimensions are illustrated in figure 1, the dotted lines enclosing the total field of view. The following directions will demonstrate the proper method of obtaining accurate reproductions of the oral structures.

Procedure. As the patient is being processed through his dental examination, he receives from the typist two perforated paper slips containing the identification data. These slips are given to the camera operator, seated behind the apparatus, who inserts the identification data into their respective brackets. The perforated slip bearing the subject's name, date of photograph, and branch of service is inserted in the bracket holder to the left of the camera operator with the subject's name at the bottom of the bracket.

The insertion of these data in the left post of the bracket holder functions as a reference point when viewing transparencies (fig. 2). Because the color transparencies produce a positive image, the left post when photographed will appear on the left side of the picture. As the subject's mouth faces the camera lens, however, the right side of the mouth would then be present on the left side of the transparency adjacent to the subject's name. If these conditions are borne in mind, the right and left sides of the mouth can be determined without confusion.

Photographing the anterior view. This is by far the easiest of the three views to photograph. The technician who sterilizes the mirrors, removes the mirror bracket frame from the apparatus and inserts the chin rest onto the cross bar between the two identification posts. The subject is given a pair of cheek retractors and places his head on the chin rest. The camera operator adjusts the subject's head to the center of the field.

Focusing is automatically determined by a pair of focusing lights that are built into the flash reflector. Each light projects a beam in the form of a horizontally split letter "o." When the subject's chin is in correct position, the split beams merge forming a distinct letter "o" on the labial surface of the anterior teeth. The camera operator assists the subject in moving his head forward or backward on the chin rest until the two beams

merge into a single figure. The operation is accomplished in a matter of seconds. The exposure is made and the preparation for the maxillary position is begun.

Figure 1. Anterior view. The dotted lines enclose the field of view recorded by the photographic apparatus.

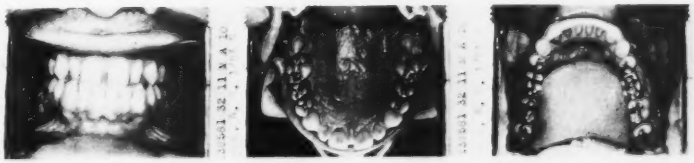

Figure 2. Completed photographic strip similar to the Kodachrome transparency for insertion in the health record.

Maxillary view. The chin rest is removed from the cross bar and the patient is instructed to open his mouth so that the width of the dental arch can be determined. The operator selects the proper sized mirror and fastens it to the mirror bracket holder. This assembly is inserted into the receptacle of the frame-stand (figs. 3 and 4).

It is essential that the patient's head be placed in proper alignment with the length and width of the mirror. The patient

is instructed to adjust his open mouth over the posterior portion of the mirror as shown in figures 3 and 4. It is the responsibility of the camera operator to determine whether the mirror is back far enough in the patient's mouth. He can accomplish this by checking the reflection on the mirror of the maxillary teeth. The patient is told to tip his head back with the mouth wide open

Figure 3. Identification apparatus in use showing position of patient, photographic unit, sterilizing rack with mirrors, and electronic power supply.

until the incisal edge of the lower anterior teeth contact the under surface of the mirror. The exposure is made and the film is advanced in preparation for the view of the mandibular arch.

Photographing the mandibular arch. To photograph the mandibular arch, the technic for obtaining the maxillary aspect is reversed. The assistant pulls the mirror bracket holder from the

socket and rotates the holder through an arc of 180 degrees. The bracket holder post is inserted into the socket on the opposite post support. This position is illustrated in figure 5.

The patient is again instructed to adapt his mouth over the mirror in such a manner that the posterior borders of the mirror rest on the mandibular ridge as close as possible to the ascending portion of the mandibular ramus The incisal edges of the maxil-

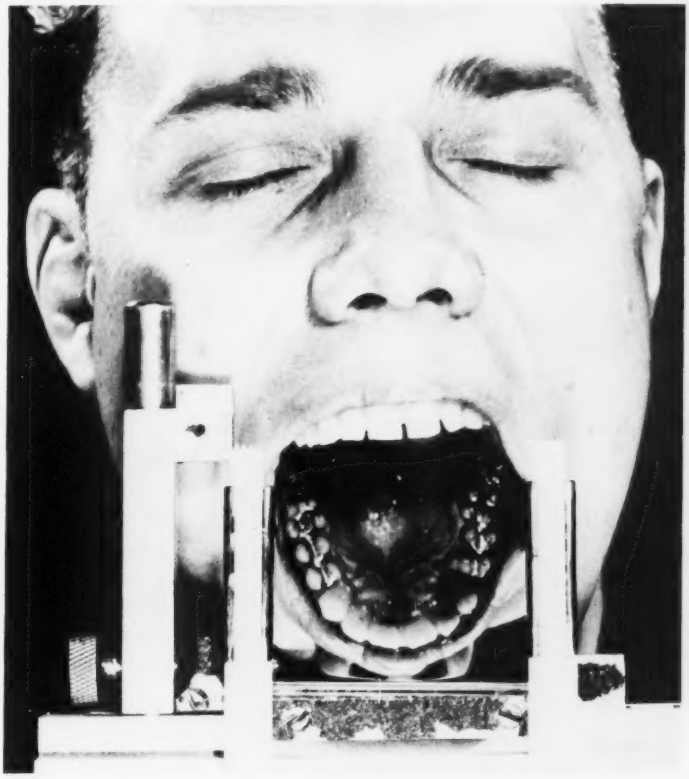

Figure 4. Maxillary position. Note position of mirror in patient's mouth.

lary anterior teeth should contact the upper surface of the mirror. The exposure is made and the film advanced immediately for the anterior view of the next patient.

DISCUSSION

The present apparatus has been subjected to extensive evaluation procedures for a period of four years. It is estimated that over 9,000 photographs have been taken in this period without the occurrence of any major breakdown or malfunction of the equip-

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ment. Quality of the photographic reproduction was considered excellent. Dental caries, fractured and stained enamel, calculus, and soft tissue lesions were easily distinguishable. Silver and gold restorations showed good color contrast.

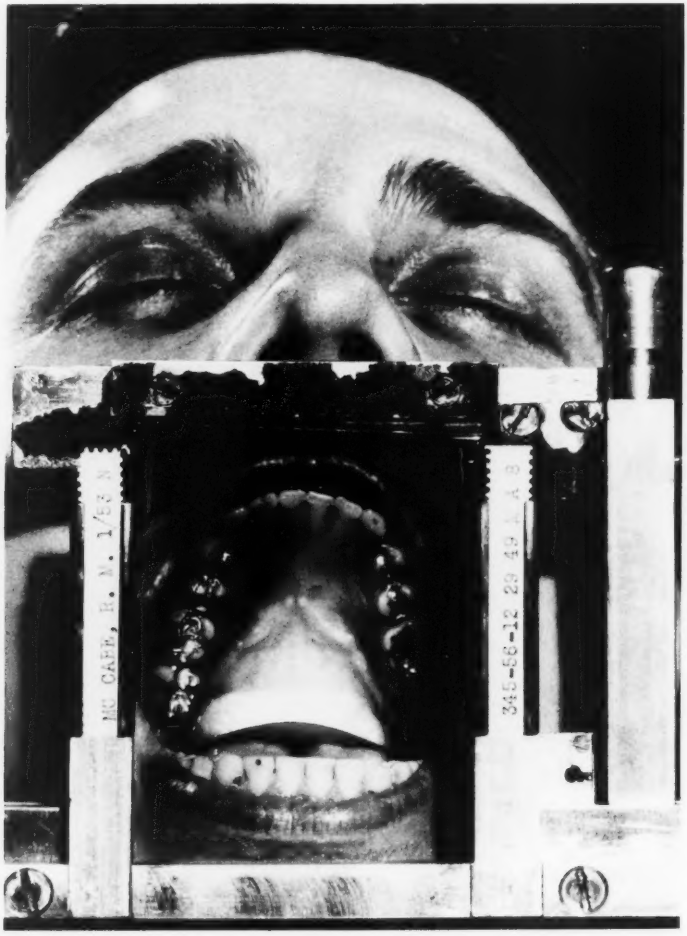

Figure 5. Mandibular position. The posterior border of the mirror is distal to the lower molar teeth. Abrasion of the cuspid and interproximal restorations in the lower anterior teeth are visible.

Because of the versatility of the apparatus, the camera unit may be disengaged from the equipment and used as a hand-held clinical camera. When taking intraoral views of occlusions, prostheses, or soft tissue lesions, the 4-inch depth of field allows all structures lying between the lips and uvula to be in sharp critical focus.

There are certain advantages in using this type of apparatus for intraoral photography. Personnel operating the instrument require no specialized training. Pertinent factors such as light source, focus, diaphragm opening and exposure time have been predetermined and remain unchanged regardless of whether the camera is being used for identification or clinical procedures. Long-term observations pertaining to the progress or retardation of caries and periodontal disease could be observed with infallible accuracy. Color balance and quality never vary because of the "built-in" predetermined exposure factor. Therefore, before and after clinical recordings on the health of the oral tissues could be made in studies concerning the effect of unusual environments, such as extensive exposure to cold and prolonged submarine voyages.

The results of this four-year field trial have shown that if the apparatus were to be used in certain induction centers, where large groups of personnel were being processed, certain modifications would be necessary to provide more efficient results. A camera body capable of holding at least 100 feet of film fitted with a rapid film advance lever and double exposure preventive device are necessary. For greater patient comfort, the photographic unit excluding the power pack should be mounted on an elevated, crank type, adjustable base to allow for differences in patient height.

SUMMARY

An intraoral photographic identification apparatus that can be operated by personnel without special training in photography has been designed, produced, and field tested successfully. Accurate, photographic reporductions of the dental structures are recorded on 35-mm Kodachrome strip film to be used as an adjunct to the dental record. Because the dental structures have been of great value in the identification of the dead, it is felt that the use of intraoral color photographs would add to the usefulness of the dental record in carrying out identification procedures.

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OSTEOGENESIS IMPERFECTA

Report of Six Familial Cases

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OSTEOGENESIS IMPERFECTA is seen frequently in the practice of orthopedic surgery and is usually familiar to the general practitioner. The cause of the condition is not known and the only basic finding is a characteristic fragility of the bones which is due to a defect in the formation of bone matrix. Many classifications have been devised. On the basis of roentgenographic findings, Fairbank[1] differentiated the disease as a slender bone type, thick bone type, and a cystic type. Other classifications are based on whether the first fracture occurs prenatally or postnatally. When the first fracture occurs at a later age, the disease is designated as osteogenesis imperfecta tarda. McKusick[2] believed that all of these types are one and the same disease which has wide systemic manifestations and an exceedingly great range of clinical severity.

Inasmuch as this condition, in essence, results in osteoporosis of varying degree, the extreme variation in severity may make the differentiation from postmenopausal or senile osteoporosis extremely difficult. Multiple myeloma also may be manifested by osteoporosis and a compression fracture of a vertebra as the first symptom.

The type manifested at birth is easily recognized, with the tiny extremities bowed on the chest and abdomen and the presence of a membranous cranium. Caffey[3] stated that Wormian bones separated by radiolucent strips of connective tissue, form a mosaic pattern in the occipital region, and that this only is found in osteogenesis imperfecta and cleidocranial dysostosis. The thin cortices found in all the bones and the slender shafts of the long bones, with abrupt flaring in the metaphyseal areas, present a characteristic roentgenographic picture, Codfish- or hourglass-shaped vertebrae and Schmorl's nodules commonly are found.

The prominence of the frontal and occipital areas in contrast to the smaller maxillary and mandibular areas is characteristic.

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The short extremities and deformities secondary to fracture usually are very evident in the more severe cases. It is interesting to note that the joints usually are excessively mobile in this condition, just as in Marfan's syndrome and Ehlers-Danlos syndrome. Commonly, the back is round and the thorax conical. Hernia is frequently found in these persons, as is excessive tooth decay, although the lamina dura is intact. The number of fractures may vary from one to more than a hundred, and usually the earlier the first fracture occurs, the more severe the condition.

The same bone may be fractured repeatedly, and the amount of trauma necessary to cause the fracture may vary considerably, but in severe cases is usually minimal. Gross displacement is unusual, as are compounding and comminution. Angulation and deformity are common sequelae following healing. As the fractures usually occur at the epiphyseal end of the metaphysis in the thinnest portion of the cortex, healing usually is rapid. The frequency of fractures ordinarily diminishes as the patient approaches puberty and the quality of the bone tends to improve with increasing age.

Bickel[4] reported a familial trend in 27.5 per cent of the patients with osteogenesis imperfecta seen at the Mayo Clinic. Of these patients with the hereditary form of disease, 45.5 per cent developed otosclerosis, usually during the third and fourth decades of life. He found no correlation between the number of fractures and the presence or absence of blue scleras. Van der Hoeve's syndrome of brittle bones, blue scleras, and deafness, was not found in all hereditary cases. Indeed, in one family which he reported, blue scleras occurred in members of four generations, but brittle bones in members of only three generations, and deafness in members of only the last two generations. The hereditary form seems to be a Mendelian dominant, non-sex-linked characteristic in that it occurs in about 50 per cent of the offspring of parents of whom one is affected and 75 per cent if both are affected. The condition may be transmitted by either male or female. The hereditary form is usually of later onset and therefore milder than the nonhereditary.

McKusick stated that if it were not for constantly occurring new cases on the basis of mutation, the disease would in time disappear.

The cases which we wish to present are interesting in that one of the patients has served on active duty on flying status in the U. S. Air Force for over 14 years. McKusick[2] has provided a more complete discussion of the condition together with a list of references.

CASE REPORTS

Case 1. This 76-year-old woman was first examined here when she was admitted with an intertrochanteric fracture of the left femur. She

and her family both denied other fractures. Her height, however, was only 59 inches and she was grossly deformed clinically, showing a scoliosis, pigeon-breast deformity, and a fore shortened trunk with kyphosis. Her roentgenograms revealed marked osteoporosis of the long bones, with ballooning of the intervertebral disks and collapse of the vertebral bodies. There were several areas on the ribs that could have represented old fractures, and one of the left humeral neck that might have been an old fracture, but these could not be diagnosed definitely. The intertrochanteric fracture occurred when she fell while getting out of bed. The fracture was fixed with a Smith-Petersen nail and plate, and the patient was maintained in a wheel chair during the period of healing. Subsequently, the nail penetrated the head of the femur, but healing progressed satisfactorily until the patient died at the age of 77 of cardiovascular accident. She did not have blue scleras and was not deaf.

Case 2. The patient was the son of the woman described in case 1. He stated that his father had been 69 inches in height and had been entirely normal. He had died at the age of 75. His paternal and maternal grandparents also were entirely normal. The patient has two sisters, one who is 46 years old, 64 inches tall, and has had no fractures and no children. The second is 42 years old, 61 inches tall, and has had no children. His one brother was stated to be 65 inches tall and 45 years of age. This brother fractured an ankle in childhood, and this healed normally. The patient's wife was stated to be entirely normal and has been examined by us. The family history of the wife reveals no evidence of brittle bones, blue scleras or otosclerosis. The patient has four children, all with normal scleras and none with otosclerosis. Their history will be given in the cases that follow.

The patient had played football in high school, had wrestled on the team at college, had ridden many broncos and had been thrown off numerous times. He had always engaged in strenuous athletics. He had been flying since 1940 and had logged more than 3,400 flying hours. In 1943 he crash-landed a B-25 aircraft in Brazil, sustaining no injuries. Shortly after this he suffered a severe fall when a cable broke and knocked him down. At that time, he was hospitalized one day with back pain. No roentgenograms were taken. He stated that at the age of 18 months he fell out of a swing and fractured his left femur, which his mother told him was a greenstick fracture. This healed normally. At 12 years of age he fractured his right arm pole vaulting, and this healed normally. He refractured this right arm at the age of 21 when he was thrown from a horse, and again the bone healed normally. A fracture of his left glenoid with dislocation of the head of the humerus occurred in a fall at the age of 35 years, and this healed uneventfully. He has had no other illnesses or injuries.

This patient was initially examined by us on 30 September 1957 at the age of 43 years when he was admitted with acute pain of sudden onset in his lower back. This began while he was landing an aircraft in a heavy cross wind. He stated that he felt a pop or snap in his lower back when he applied full left rudder and left brake to prevent the aircraft from veering to the right.

Examination upon admission revealed tenderness over the twelfth thoracic and first lumbar vertebral area, a negative straight-leg raising test, and slight spasm of the lumbar muscles. Within 12 hours the spasm became much more severe. Roentgenograms revealed marked central collapse of the first lumbar vertebral body of recent origin. It was noted that the roentgenograms of the spine showed considerable osteoporosis. Skeletal survey of both femurs and anteroposterior and lateral views of the skull were all essentially negative except for some osteoporosis. No punched-out areas were noted. The laminae dura, however, were poorly defined. Serologic tests for syphilis were negative. Alkaline phosphatase was 4 Bodansky units. Total protein was 6 grams (albumin 3.9 grams and globulin 2.1 grams) per 100 ml. The sedimentation rate was 23 mm per hour (Wintrobe), with a hematocrit of 46 mg per 100 ml. Repeated urine examinations for Bence Jones protein were negative. A sternal marrow puncture was normal. Serum calciums were performed on two occasions with findings of 9.6 mg and 10 mg per 100 ml. Phorphorus was found to be 3.4 mg per 100 ml and a repeat alkaline phosphatase was 4.5 Bodansky units. A 24-hour excretion of phosphate was 1.5 grams. A 24-hour urine specimen showed a calcium excretion of 231 mg after the patient had been on a 200 mg calcium diet for five days. Urinary excretion of 17-ketosteroids was about twice normal at the time of admission. Blood sugar was 87.5 mg per 100 ml and serum urea was 11 mg per 100 ml.

Forty-eight hours after admission the patient developed severe paralytic ileus and bladder dysfunction necessitating continuous gastric suction, intravenous feedings, and bladder catheterization for about six days. Subsequent to this, recovery was uneventful, and after the patient was worked up in considerable detail, all other possible causes were considered to have been ruled out. He was discharged back to duty not involving flying, wearing a Taylor brace. Subsequent roentgenograms revealed telescoping of the twelfth thoracic vertebra into the collapsed body of the first lumbar vertebra. Healing progressed rapidly and was complete at six months postinjury, although the vertebral height was not restored.

Case 3. The oldest child of the patient in case 2 is a girl 10 years of age. She was born with a fractured skull and fractured femur. The diagnosis of osteogenesis imperfecta was made at birth. She had had a compression fracture of the spine at the age of five, the results of a fall. She had a fracture of the right arm at seven years of age and a fracture of the left femur at eight years of age, both sustained in falls. She also has a marked varus deformity of the right hip with anterior bowing of the left femur. She has been treated here for a slightly displaced fracture of the left humerus through the proximal epiphysis, which occurred following minimal trauma, and for a fracture of the distal right radius. She has white scleras and is not deaf. She has a very minimal scoloisis which is being followed and her roentgenograms reflect the osteoporosis and ballooning of the intervertebral disk characteristic of osteogenesis imperfecta. She has recently been treated for a refracture of the left femur and has had an osteotomy to correct the coxa vara deformity of the right hip.

Case 4. The oldest son of the patient in case 2 is nine years of age. He had a fracture of the left tibia at one month of age, and at the age of eight years fractured his left femur in a fall. This healed normally with slight anterior bowing. He recently sustained a fracture of the compression type of the eighth and ninth thoracic vertebrae while wrestling. On roentgenographic examination he was noted to have osteoporosis of the bones of the hands and of the skull as well as osteoporosis of the femur and vertebral bodies. He has white scleras and is not deaf.

Case 5. This is the second son of the patient in case 2. He is seven years old and has had no fractures. He is taller than his 10-year-old sister (case 3) but not taller than his nine-year-old brother (case 4). He is heavier than the rest of the family, and roentgenograms of the long bones and of the vertebrae show that the bones are of normal texture and density.

Case 6. The third son of the patient in case 2 is two and one-half years of age. This patient has had no fractures to date. He has white scleras and is not deaf. He has been followed here, however, for the past six months because of slight difficulty in using his right upper and lower extremity. Apparently he was a normal-term delivery and has had no serious illnesses, injuries, or convulsions. His mother stated that he has had difficulty in using his right hand in that he is unable to extend the fingers fully and to employ the hand for useful maneuvers. This has improved with therapy. It was also noted that his anterior fontanel was still open and was quite large, and that there was slight disproportion of the head to the body. The child, however, appeared to be of normal intelligence. On examination it was believed that there was some spasticity in the right lower and right upper extremities and that this represented a mild case of cerebral palsy. Examination of the roentgenograms revealed no evidence of osteogenesis imperfecta, although the bony texture was not as dense as would be expected in his age group.

DISCUSSION

The degree of severity with which different members of the family are affected may vary, as has occurred in our cases. The fact that such a condition is not inconsistent with normal longevity has been pointed out many times previously yet still bears repetition because it is in such marked contrast to the more severe cases usually seen. The active useful life which has been led by the patient in case 2 is exceptional and bears witness to the courage and cheerfulness which characterize him. It is important to emphasize the considerable force exerted by this officer in maintaining control of an airplane at the time of his fracture and the position in which the force was exerted. This presumably explains the occurrence of a fracture on this occasion, whereas no fracture had previously occurred in 17 years of flying.

SUMMARY

We have presented an interesting family history in which four members of the family, comprising three generations, were affected with osteogenesis imperfecta. None of the affected members had blue scleras or otosclerosis. One patient lived to the age of 77, another (her son) has engaged in athletic activities and lived an active useful life, including a career as a pilot in the U. S. Air Force for over 14 years. He has four children, of whom two are affected, one much more severely than the others.

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MADE IN ARABIA

The turn of political fortune now focuses our attention upon the Middle East, land of enchantment, land of the Arabian Nights. From the shores of Phoenicia, now Lebanon, came the greatest discovery ever made by the mind of man, namely: that the human voice is capable of twenty-eight sounds and these sounds can be represented by written symbols. Thus was born the alphabet, the first two letters of the word being the Greek letters, *alpha* and *beta,* derived from the original Phoenician *aleph* and *bay.* Middle Eastern culture has deeply influenced Western civilization. Street lamps, windowpanes, fireworks, stringed instruments, cultivated fruits, perfumes, and spices are among their contributions to our society. Alcohol, cotton, sugar, and sofa retain their original Arabic names. That often changed and often washed undergarment, the chemise, is an Arabic word surviving through the centuries.—William Bickers: The Middle East and Our Medical Heritage (editorial). *Virginia Medical Monthly,* October 1958.

SYMPOSIUM ON EMERGENCIES

Poisoning in Children

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OF all the tragedies that can befall parents, the greatest is the loss of their child. When this loss is the result of an accident the loss is magnified many times. A fact now well-known is that accidents are the leading cause of death in children. Each year over 6,000 children between the ages of one and four years, alone, died as a result of accidents. Of these 6,000 children, over 1,500 die as a result of swallowing poisonous material. To obtain a more vivid picture of this subject and its importance let us review some of the statistics in our own state of Minnesota.

Table 1 gives the number of fatal poisonings under the age of 15 years of age as reported by the Minnesota State Board of Health in a five-year study from 1951 through 1955. Of these 39 fatal poisoning cases in this group salicylates lead as the most frequent medicaments ingested. Let us remember that the incidence of accidental poisoning in children is inadequately represented by mortality tables. It is unfortunate that we have no accurate statistics to show us the frequency with which poisoning occurs. It has been estimated that 1 per cent of all pediatric hospital admissions each year are for accidental poisonings. Even this does not give us a complete picture for there are many cases of poisonings that are treated in the home and in the physician's office and as outpatients in the hospitals. Nevertheless recent studies were made in two separate hospitals in the city of Minneapolis pertinent to this point.

Table 2 gives a summary of a five-year study at Northwestern Hospital made by Dr. Albert Schroeder, in which he reported 868 cases of accidental poisonings in children under the age of 15 years. Note that the largest percentage of accidental poisonings occurred as a result of ingestion of medicaments.

Table 3 shows a one-year study done at the Minneapolis General Hospital by Dr. Richard Raile. In this one-year study in

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Presented in the Symposium on Emergencies, Minnesota State Medical Association, Minneapolis, May 22, 1958. Reprinted with permission from *Minnesota Medicine* 41: 741-753, November 1958.

1955, there were 340 poisoning cases under the age of 14 years of age treated at the Minneapolis General Hospital. Of this number, 191 were due to the ingestion of medicaments. Salicylates again were the constituted group of medicaments most frequently ingested. These two case reports closely parallel reports from elsewhere in the United States showing that the most frequent accidentally ingested products are medicaments. The most common drug killer is aspirin and other salicylate products. Aspirin outrates all other medicaments in frequency of accidental ingestion.

TABLE 1. Fatal poisonings under age 15

(Minnesota State Board of Health, 1951 through 1955)

Medicines	19
(10 from salicylates)	
Household substances	13
(hydrocarbons, lye, et cetera)	
Pesticides	1
Miscellaneous	6
Total	39

TABLE 2. Poisonings under age 15

(Northwestern Hospital – Minneapolis, 1951 through 1955)

Medicines	516
(363 from salicylates)	
Household substances	135
(hydrocarbons, lye, et cetera)	
Pesticides	90
Miscellaneous	127
Total	868

TABLE 3. Poisonings under age 14

(Minneapolis General Hospital, 1955)

Medicines	191
(127 from salicylates)	
Household substances	61
(hydrocarbons, lye, et cetera)	
Pesticides	38
Miscellaneous	50
Total	340

Figure 1 shows that the incidence of poisonings is the greatest in the one-year to five-year age range. Its peak is in the two-

year to three-year age group. Recall the development of a child during this period: the motor development is very rapidly enabling a child to walk, climb, pull open drawers, doors and cabinets. A

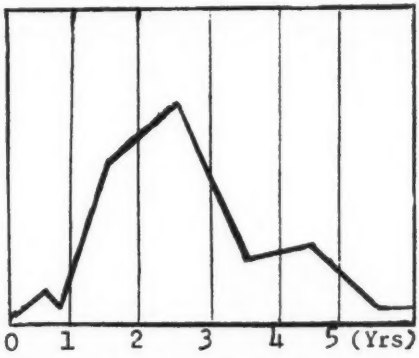

Figure 1. Incidence of poison ingested by children according to age.

child of this age is an explorer, an adventurer and a taster. If he can pick it up he will smell it and/or put it in his mouth and swallow it. It is during this period then that the greatest number of accidental poisonings in children occur.

SYMPTOMS

Table 4 emphasizes that the symptoms of acute poisoning will vary with the poison consumed but in general will fall into one or more of the following groups:

1. *Gastrointestinal.* Nausea, vomiting and abdominal pain are the most common symptoms encountered.

2. *Respiratory.* This may range from mild hyperpnea as seen in salicylate intoxication to complete respiratory collapse with loss of consciousness as found in barbiturate or nicotine poisoning.

3. *Circulatory.* This may be manifested by cyanosis, hemorrhagic manifestations and shock.

4. *Corrosive action.* Evidence of erosion of the oral and pharyngeal mucosa and esophagus will occur with the ingestion of lye, phenol, alcohols and acids.

In any child who presents one or more of the foregoing symptoms and in whom adequate evidence for their cause cannot be determined, acute poisoning should be considered. The absence of history of poisoning does not rule out this possibility. It is well to remember that children are usually too young and usually too frightened to give an accurate and adequate history. The latter may often be said of the parents as well.

TREATMENT

Of the dozens of telephone calls that the busy physician receives daily from worried and frantic parents inquiring as to the welfare of their sick child, very few of these calls constitute a real emergency. Any call about a child who has ingested a poisonous material or who has been suspected of ingesting a poisonous material is truly an emergency call; it can be strongly stated that in poison cases a matter of minutes may mean the difference between life or death. The treatment of poisoning must be immediate. As physicians, we must accept this as a fact. As physicians, we must convince the parents of this fact. Table 5 indicates that the treatment may be divided into three stages:

TABLE 4. Symptoms

1. Gastrointestinal
2. Respiratory
3. Circulatory
4. Corrosive

Removal of the Poison. This may be accomplished by the use of an *emetic*. In general, it can be stated that the use of emetics as the *only* treatment of acute poisoning cases should be *avoided*. First of all because they are usually inadequate to empty the stomach and secondly they tend to give one a false sense of security. If emetics are used they should be used only as a preliminary emergency measure and should be followed by a gastric lavage.

TABLE 5. Treatment

1. Removal of poison
(a) emetic
(b) gastric lavage
(c) exchange transfusion
2. Antidote
(a) specific
(b) universal
3. Supportive care

In recent work done in the Department of Pediatrics at Western Reserve University in which dogs were fed toxic levels of sodium salicylate, it was discovered that induced emesis within thirty minutes after ingestion significantly altered the blood salicylate level. I believe that it can be reported from this work that the induction of emesis as soon as possible after ingestion of salicylates is distinctly advantageous in this type of poisoning. However, I do believe that this should still be followed by gastric lavage. Although there are many types of emetics that are available and can be used, apparently the most effective is syrup of ipecac. In our practice, we are now routinely prescribing 1 ounce of syrup of ipecac to parents with instructions to keep this for

the specific use of inducing vomiting in their child in case of accidental poisoning. This is given to the parents along with a brief lecture on the dangers of accidental poisoning when the infant is approximately nine to ten months of age.

The method of choice in removal of ingested poisons is *gastric lavage*. In all cases or suspected cases of poisoning, lavage should be done immediately. There are certain exceptions to this rule. These exceptions are in patients who have consumed lye, ammonia, acids, strong alkalies and phenol. It is also to be avoided in the unconscious or convulsing patient. In the former group it is avoided because the danger of perforation of the esophagus and in the latter group because of the danger of aspiration during the procedure. It is the opinion of the author that lavage should also be avoided in hydrocarbon ingestion such as kerosene and fuel oil because of the increased incidence of bronchial pneumonia following this procedure. The technique of gastric lavage is a simple and well-known one. However a few points are worthy of emphasis:

1. Put child in Trendelenburg position.

2. The larger the tube passed, the easier and quicker the procedure.

3. Suction mouth and nasopharynx frequently during procedure to prevent aspiration.

4. Use small amount of lavage solution at a time—50 to 100 cc. maximum. Repeat for total of 1 liter.

If the desired solution is not available, one should not delay the procedure. It is wiser to use water than lose valuable time. Before the tube is withdrawn, the specific or universal antidote is placed in the stomach. The tube should be pinched before its withdrawal to prevent possible aspiration of the material from the tube into the trachea.

When there is a long time-interval between the ingestion of a poison and the starting of therapy, it is possible that much of the toxic material will have already been absorbed into the blood stream. Also there are certain poisons and toxic products of poisons that tend to remain in the blood stream in contrast to becoming fixed or deposited in the body tissues. It is in situations such as these that *exchange transfusions* may have great value. A specific instance is in salicylate poisoning. When the child is comatosed and/or the blood salicylate level is 65 to 70 mg. per cent, exchange transfusion should be considered. Another indication for considering exchange transfusion is in severe methemoglobinemia as in the result of ingestion of analine dyes or nitrates.

Antidote. When one turns to one's therapeutic armamentarium in search for an antidote for a certain poison, one suddenly real-

izes there is not an effective antidote for every known poison. As a matter of fact, specific antidotes are relatively few. It is not the function of this discussion to list the various antidotes for the various poisons but rather to re-emphasize a well-known fact. With the plethora of pharmaceutical products, proprietary products, patent medicines, household substances that are now available to the public, it has been estimated that there are approximately 250,000 trade names of such substances on the market today and this number is increasing daily. With this great number of products it is impossible for the practicing physician to be adequately informed as to the contents of each and every one of these, and to add to this dilemma, the labeling of these packages is often inadequate or lists long complex chemical names with which the average physician is not familiar. When the ingredient of the material ingested is unknown, adequate treatment for poisoning of course becomes more difficult. In order to solve the physician's dilemma in this situation, poison control centers have been set up throughout the entire United States. It is to these centers that the physician can turn for help. It is from these centers that the physician can obtain accurate knowledge and information as to the ingredients of the product that has been swallowed and also information as to the specific antidote, if any, and recommendations regarding additional treatments to be given in the particular case under question.

When no specific antidote is available or when the nature of the poison is unknown, the use of the universal antidote is indicated. This should be placed in the stomach before the removal of the lavage tube, if possible.

Supportive Care. Close observation of all patients who have ingested poisons is imperative regardless of the initial therapy. Hospitalization for at least a 24-hour period is advisable for delayed action (shock, electrolyte imbalance, cyanosis, et cetera) may follow in spite of what may seem adequate therapy at the time. The judicious and propitious use of oxygen, blood, electrolytes, stimulants and analgesics may not only be lifesaving but will also render the patient more comfortable.

POISON CONTROL CENTER

A poison control center is primarily an information center, a point where a current index is compiled and maintained that lists the constituents of all proprietary products, patent medicines, home remedies and household articles. In addition to this, the poison control center keeps abreast of the latest treatment and antidotes to be used in specific poison cases. This information is available on call of any physician or hospital. Some readers will recall that in 1957 at the Minnesota state medical meeting in St. Paul, the Minneapolis chapter of the American Academy of Pediatrics proposed the poison control center for the state of Minnesota. It is my pleasure to inform you that this poison con-

trol center is now in existence. Through the combined efforts of the Minnesota chapter of the American Academy of Pediatrics, the Department of Pharmacology of the University of Minnesota, the city Health Departments, our Minnesota State Health Department, and the Minnesota State Pharmaceutical Society, the mother center of the Minnesota Poison Control Center has been established. It is in conjunction with the Minnesota State Board of Health. Within six months, substations of this poison control center will be established throughout the entire state of Minnesota. . . .

A discussion of poisoning in children is not complete without emphasis on its prevention. Although significant advances in prevention have been made by organizations such as the National Safety Council, the American Academy of Pediatrics, the various life insurance companies, the State Board of Health, the campaign for the prevention of poisonings can and must be brought directly to the office of the individual physician. He can and should become the most ardent campaigner for this cause. He can awaken the parents to the possibility of poisonings in the home. He should lay the facts before the parents—the morbidity, the mortality and the serious sequellae. He must underscore that 99 per cent of accidental poisonings are due to the neglect of the parents. A child cannot read the poison label. Specific instructions by the physician to the parents to carry out a household inspection on their arrival home will be rewarding. The gospel of prevention should be given when the child begins to crawl, or preferably before. The physician may enhance the prevention program in another way. He can discourage the use of candy-like medications such as aspirin, advise against the use of over-the-counter and devious home remedies. The physician as an individual and the physician in an organized society can and should express his desire to the pharmaceutical companies for a safer packaging of their products.

Treatment of Cardiac Emergencies

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CARDIAC emergencies are commonly encountered in practically all segments of clinical medicine. Fortunately, with the exception of circulatory arrest, instantaneous action is rarely necessary. Prompt attention is certainly the rule, but not before adequate evaluation and accurate diagnosis. Some potentially emergent states are self-terminating; some may persist for days without harm to the patient—as with atrial tachycardia in the absence of serious heart disease; others require prompt and dramatic maneuvers.

The ability to arrive at a prompt and accurate diagnosis is not enough. The physician must be equipped to institute appropriate therapy apart from the confines of a hospital unit. Many emergencies must be managed initially in the home. Every physician exposed to this possibility must keep the necessary agents at hand.

The conditions most frequently encountered as emergencies are the cardiac arrhythmias, circulatory arrest, acute left ventricular failure, acute myocardial infarction and insufficiency and cardiac tamponade.

CARDIAC ARRHYTHMIAS

The gravity of the presenting arrhythmia is dependent for the most part on the ventricular rate and the underlying cardiac status of the patient. Some arrhythmias are benign while others are of the utmost significance. Specific diagnosis is essential to the appropriate and individualized management of the arrhythmia.

Extrasystoles. Frequent premature contractions are commonly seen in a normal heart. In association with acute myocardial infarction, extremely frequent or multifocal extrasytoles may warn of a serious emergency to follow, such as a ventricular tachycardia. Oral medication, even in this situation, should suffice. Quinidine 0.2 gm. or procaine amide hydrochloride (Pronestyl) 250 mg. four to five times daily is usually adequate but should be increased to twice this dosage if the extrasytoles are not controlled.

Paroxysmal Auricular Tachycardia. This condition is frequently well tolerated except in the presence of serious organic heart disease and the extremes in age. It is usually self-limited and in most instances will revert before specific therapy can be instituted. It is usually alarming to the patient and deserves prompt medical attention. Reflex vagal stimulation through carotid sinus pressure will often produce prompt cessation of the attack. This maneuver may be hazardous in elderly patients in whom drug therapy with quinidine or digitalis becomes the treatment of choice. Simple sedation with sodium pentobarbital affords adequate therapy in many uncomplicated incidences where the urgency is not great. Intravenous cedilanid 1.2 to 1.6 mg. or digoxin 0.5 mg. and 0.25 mg. every two hours to a dose of 1.5 mg. affords the most dramatic form of therapy and is frequently followed by prompt conversion. This is particularly true in infants when a dose of 0.5 mg. cedilanid is frequently used. Oral digoxin with an initial adult dose of 1.0 mg. and twenty-four hour dose of 2.0 to 3.0 mg. may be used in less urgent situations. Quinidine sulfate is used as the treatment of choice in the elderly patient by some clinicians. It should be employed in all patients who do not convert with the above-mentioned measures in the absence of distinct contraindications to the use of quinidine. The oral route

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is preferred; the condition of the patient may demand the parenteral route. An oral dose of 0.4 gm. every three hours is commonly employed, the total dose varying according to the tolerance of the patient. The intramuscular dose is the same as the oral. In critical instances the intravenous route is employed. Quinidine lactate, 0.65 gm. diluted in 100 cc. 5 per cent glucose, administered at a rate of 2 cc. per minute may be given. The electrocardiogram is used as a monitor during the infusion which may be stopped with signs of toxicity. Pronestyl has enjoyed considerable popularity but evidence does not support these views, particularly in auricular tachycardia where quinidine remains as the preferred drug. Pronestyl has approximately one-third the potency of quinidine and must be used in comparatively larger doses. Its place is more clearly established in ventricular tachycardia.

Pressor drugs, probably through their ability to cause reflex vagal stimulation, play a lesser role but may be tried when more conventional methods fail. Intravenous neosynephrine 0.5 mg., nor-epinephrine, methoxamine hydrochloride (Vasoxyl) and mephentermine sulfate (Wyamine) have all been employed. The drastic side effects of mecholyl makes its use extremely limited.

Auricular tachycardia may be encountered in association with atrio-ventricular block, this commonly as a manifestation of digitalis intoxication. Digitalis should be discontinued immediately in this situation as well as in other arrhythmias occurring as a consequence of digitalis. A potassium salt, orally, as a single dose of 3 to 5 gm. or parenterally in a concentration of 80 to 100 mEq per liter given at a rate of 0.5 to 1.0 mEq per minute is used to counteract the digitalis intoxication.

Both quinidine and pronestyl are strongly contraindicated in the presence of any form of atrio-ventricular block. They are capable of depressing an ido-ventricular rate and causing ventricular fibrillation.

Auricular Flutter and Fibrillation. The gravity of the clinical state is for the most part dependent upon the ventricular rate in both auricular flutter and fibrillation. They constitute an emergency only when the degree of A-V block allows a rapid ventricular rate. Emergency therapy consists of slowing the ventricular rate by increasing the A-V block with digitalis, the route determined by the degree of the emergency. Quinidine may be employed subsequently if the digitalis fails to convert the heart to a normal rhythm.

Ventricular Tachycardia. Ventricular tachycardia is most frequently seen as a complication of acute myocardial infarction and may be seen as a manifestation of digitalis intoxication or anoxic states. Paroxysmal ventricular tachycardia is quite unusual.

The clinical status of the patient may allow oral therapy. Quinidine sulfate in a dose up to 0.6 gm. every two hours to a total dose of 3 to 4 gm. is not uncommonly used. The intramuscular route can be used, employing the same dose schedule when the oral route is not possible. Some clinicians prefer Pronestyl for use in this arrhythmia. The merits of each seem to be quite comparable in this situation when used in a comparable dose as described.

The occurrence of ventricular tachycardia in association with acute infarction presents a grave situation and demands immediate therapy. Parenteral Pronestyl or quinidine is preferred. In spite of the frequent occurrence of hypotension with intravenous pronestyl in effective doses, it is preferred to intravenous quinidine by many authors. It is used in a dose of 0.1 gm. per minute to a dose up to 1.0 gm. Intravenous quinidine given as previously described may be used as the emergency demands, but cannot be given without assuming the risk of creating a more urgent situation. Neither quinidine nor pronestyl should be used when an atrio-ventricular block is known to exist.

CIRCULATORY ARREST

Carotid Sinus Syncope. Such episodes consisting of extreme bradycardia or standstill are usually of short duration spontaneously terminated before any therapy can be instituted. An attempt at prevention of recurrent attacks with anti-cholinergic drugs forms the usual basis of therapy.

Complete Heart Block and Stokes-Adam Syndrome. Complete heart block may be associated with syncopal attacks, these usually due to paroxysmal ventricular fibrillation or asystole. Occasionally persistent ventricular tachycardia may be the mechanism. Determination of the mechanism is of utmost importance since beneficial therapy in one instance may be deleterious in another. Fortunately many attacks terminate spontaneously.

The use of quinidine and Pronestyl is contraindicated because of the possibility of converting an idioventricular rhythm to a cardiac standstill. In ventricular asystole, mechanical stimulation by pounding on the chest should be tried immediately. Intracardiac adrenalin, 1 cc. of 1:1000 dilution, may be given if death appears likely. With ventricular tachycardia or fibrillation, adrenalin is of no value and may well be harmful. Treatment of paroxysmal ventricular fibrillation is quite unsatisfactory. Intravenous isopropylarternol hydrochloride (Isuprel) has been of apparent benefit in cases where ventricular tachycardia is the cause of the syncopal attack. Isuprel intravenously or sublingually has been helpful particularly in the prevention of syncopal attacks by increasing a slow idioventricular rate and thereby decreasing the likelihood of recurrent fibrillation. Rarely an attack will occur with simple slowing of the basic rate and may

be effectively handled with Isuprel administered by either route. The effective use of molar lactate in the prevention and treatment of cardiac standstill has also been described.

The most rational form of treatment in asystole is the externally applied electric pacemaker. It is of no value in ventricular fibrillation. This should be used at the onset of asystole as the treatment of choice when available. Externally applied electric counter shock has been used as a defibrillating mechanism as described by Zoll.[1, 2]

Direct cardiac massage has enjoyed undue popularity in the recent past. In the hands of the inexperienced and under poor conditions, such a maneuver is certain to produce disastrous results. The benign course of a syncopal attack about to terminate spontaneously could well be fatally altered by a thoracotomy. Direct massage is inadvisable unless the patient is in the operating room or can be moved there directly. The situation must be carefully weighed before such a hazardous procedure can be undertaken.

Cardiac Arrest. As used here, cardiac arrest will not include the afore-described Stokes-Adams syndrome but will include arrest accompanying surgery. Prophylaxis through adequate preoperative preparation of the patient and careful anesthetic control are important. Hypoxia, changes in acid-base balance and underlying cardiac disease are all important etiologic factors. Atropine in adequate dosage is used to suppress excessive vagal stimulation.

The two purposes of emergency treatment are the establishment or re-establishment of an adequate oxygen system and the restoration of the heart beat. While the airway is being established and 100 per cent oxygen delivered, external cardiac stimulation by pounding on the chest or attempted massage through the diaphragm when the abdomen is open is employed. However, with only minimal delay, the chest is opened and direct cardiac massage instituted. The electric pacemaker is ideal for standstill. If this is unavailable, massage is continued. Intracardiac adrenalin may be tried after several minutes of massage. Should the ventricle be found to be fibrillating, massage followed by electric shock for defibrillation is employed. Asystole following defibrillation must be managed as just described.

ACUTE PULMONARY EDEMA

Acute left ventricular failure with pulmonary edema is commonly encountered as a medical emergency. It is usually associated with hypertensive cardiovascular disease, valvular heart disease or in association with myocardial infarction. Many will be treated initially or entirely outside the confines of a hospital unit.

Simple measures employed early will do much to ease the distress. The patient should be placed in a sitting position with the legs dependent. Morphine sulfate, usually in a dose of 16 mg. intramuscularly, frequently produces dramatic relief. Care must be taken in advanced pulmonary disease such as pulmonary emphysema when meperdine hydrochloride (Dermerol) is better tolerated. Tourniquets may be applied to all extremities to effect further pooling of blood when the earlier measures have not sufficed. These tourniquets are applied to occlude the venous return but not the arterial flow. Intravenous aminophyllin will relieve bronchospasm in many instances. The patient should be digitalized promptly with one of the rapid acting preparations such as desacetyllanatoside C (Cedilanid D) or digoxin as described under cardiac arrhythmias. Mercurial diuretics will be of delayed benefit. These measures can all be easily instituted in the home and frequently will suffice to control the current emergency.

When hospitalization is required because of inadequate response or complicating circumstances, inhalation of oxygen with an aerosol of antifoaming agent is indicated. Thirty per cent ethyl alcohol placed in a humidifier or nebulizer is recommended. A positive pressure breathing apparatus may be of additional help in the more acute states. Occasionally when the venous pressure is high and distress acute, a phlebotomy of 600 to 800 cc. becomes necessary to initiate the return to compensation. This is not advisable in states of shock or acute infarction.

MYOCARDIAL INFARCTION

Acute myocardial infarction presents an extremely variable picture with treatment varying accordingly from conservative observation to intensive emergency medical management. It is generally agreed that the patient should be hospitalized where absolute bed rest can be enforced. Pain should be relieved promptly with an opiate such as Demerol or morphine. The dose will vary with the patient and the severity of the pain. When the pain is severe, Demerol given slowly (intravenously) may be used until the desired effect is obtained. Oxygen should be used during the early days if any significant distress is apparent. It frequently helps to alleviate pain and generally improves the status of the patient. The mask is more effective but should be replaced with a tent if undue apprehension is apparent. The controversy over anticoagulant therapy need not enter into this discussion since it is not a part of emergency care.*

Congestive heart failure, cardiac arrhythmias and shock are the chief serious complications of acute infarction. Congestive failure and the arrhythmias are treated as previously discussed. The mortality increases sharply in the presence of shock in spite of

*A number of cardiologists feel that it should be used in the acute stage of the disease. —*Editor (Minnesota Medicine)*

prompt medical attention. Various pressor drugs are now available. Mephentermine sulfate (Wyamine) in large intravenous doses has been shown to be effective. Forty-five to 60 mg. are given at once followed by an infusion of 300 to 600 mg. in 500 cc. 5 per cent dextrose in water. Aramine bitartrate used both by the intramuscular and intravenous routes has been very useful. Norepinephrine has been used extensively as a slow intravenous drip with 4 to 16 mg. in 1000 cc. 5 per cent dextrose given at a rate necessary to restore normal blood pressure. It has the disadvantage of requiring constant professional observation. Severe ischemic reactions with sloughing have occurred secondary to subcutaneous infiltration. Too frequently, the response to pressor agents is a transitory one followed by a state of non-responsive shock and death. However, their use has undoubtedly made recovery possible in some otherwise hopeless situations.

CARDIAC TAMPONADE

Tamponade is very frequently caused by hemopericardium as a terminal event secondary to rupture of the heart or dissection of the aorta. However, exudation, transudation or controlled bleeding may produce serious cardiac tamponade relieved by draining of the pericardial sac. This can be performed without great difficulty by needle aspiration through an anterior approach. The relief of symptoms can be dramatic. Direct surgical drainage carries very little risk today and has the advantage of making a pericardial sac biopsy available.

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Emergency Diagnosis of Unconsciousness

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CERTAIN large institutions receiving great numbers of patients have had the wide experience needed to tabulate some of the causes of unconsciousness met with as emergencies. I have not hesitated to borrow freely from all sources which could give me help, and the rules in effect in city hospital emergency rooms have proven to be most useful.

In the first place, the practicing physician is able to sort out many patients whose unconsciousness stems from benign causes, and even to do this to a limited extent on the telephone. The

simple faint of an excited girl in a big crowd at a party is cured before the physician arrives. I might add that most of the time, even if I think I know what is the matter with an unconscious patient, it seems better to drop everything and run to the patient if I can. Benign unconsciousness looks like just as much of an emergency as any other kind, and the reaction of bystanders is usually less than calm; the arrival of a doctor at this point may put him at quite a disadvantage as far as the care of the patient is concerned, but it is evidence of good faith and devotion, and we need to make visible as much of this evidence as we can in the present day.

In these simple faints, with patients who are known to us, the history just about makes the diagnosis, and a simple examination made on the spot will confirm it. In what I am about to say, the history and examination are equally important, even though we shall be dealing with more serious troubles. With patients brought to a hospital by ambulance, the history is missing, and if it is not obtained by telephone or from an accompanying relative, one is left to practice veterinary medicine. I intend no slur on my brother practitioners who care for dumb animals, but wish to emphasize the difficulty of the situation we are discussing.

The police are reliable and efficient aids in getting an emergency history when the situation permits and demands their service. They are also wise enough to nose around and hunt for liquor and pill bottles—partially and completely empty. They know where in a menage to find them. One must simply remember not to ask their aid with the wrong patient or family, if offense might be given.

In large published series, the history makes or confirms the diagnosis in eight patients out of ten. These figures include the 60 per cent of all patients having comas which are alcoholic in origin who find their way to city hospitals.

One should try to get information about the type of onset noted, any injury, infections, convulsions, diabetes, headache, heart trouble, kidney trouble, high blood pressure, and consumption of alcohol or other poisons.

Physical examination must be rapid and thorough. It is not a time to linger over details which are of doubtful aid. On the other hand, listening to the heart to see if it is beating is not an adequate examination either. The color, posture and movements of the patient must be noted. He must be gone over thoroughly for wounds and evidence of injury. This requires the removal of clothes, but I have seen it tried without. One needs to be burned with this kind of fire only once, though, to learn his lesson. Shock must be determined at once, and if it is present, must be treated before anything else is done.

Pupils, optic fundi, ears, nose and throat must be tested and examined. One of the few times I ever played the role of hero was with a patient who had fever, was unconscious, and had a normal spinal fluid demonstrated elsewhere earlier the same day. I looked in his ears and he had a cholesteatoma on the left with a foul discharge. His lateral sinus thrombosis was successfully operated on after a second spinal puncture showed a positive Queckenstedt test on the left, and without question I had helped to save his life.

Odors must be noticed. Alcohol can be detected often on these patients, but the examination cannot stop at that point. Every other cause of coma can occur in an alcoholic patient, and the non-alcoholic can get sick and take a drink because he feels it would be good for him or would make him feel better, only to become unconscious from his illness an hour later. Illuminating gas and acetone have characteristic odors which lead one straight toward diagnoses.

The neck must be tested carefully for stiffness. Heart, lungs and abdomen must be looked over quickly, and their signs evaluated carefully. How can one diagnose a ruptured spleen without an abdominal examination? Or a dissecting aortic aneurysm? Reflexes have to be examined, the rectal glove used, and finally, the general impression of the patient must be summarized at this point before anything else is done. Most of the time the job of diagnosis is now finished, but about a fourth of the time, further information must be had on an emergency basis; this usually requires laboratory and x-ray examinations.

Skull x-rays must be made on all injury cases who are unconscious, unless the patients are in shock. Then they can wait. All patients with obscure diagnoses must have skull x-rays too. A chest film may be done later. Sometimes this will lead one on to an unsuspected tuberculous meningitis.

Where the question of poisoning seems to exist, lavage of the stomach must be carried out efficiently with a large tube and the washings must be saved carefully for diagnostic purposes as well as for legal use later. With many if not all unconscious patients, an inlying nasogastric tube is helpful not only for diagnosis but for treatment, too. The bladder must be catheterized and a complete urinalysis done, as well as a culture made. Many of the Gram-negative bacteremias with shock occur secondary to urinary tract infection or instrumentation. Patients still catheterize themselves. Finding no sugar in the urine does not mean that the patient is not diabetic. If insulin lumps are found on the thighs, the patient may be in insulin shock. Only a blood sugar will determine this.

Hemoglobin, blood smear and white blood cell counts may be needed. If there is fever, or suggestion of infection, a blood culture must be drawn. Severe infection with unconsciousness

often produces blood stream infection, and specific treatment requires this information, particularly if the condition has been produced by previous antibiotic treatment.

In the "medical" type of unconsciousness, blood urea nitrogen and Wassermann tests have to be started. Many clinicians recommend determination of amylase and carbon dioxide combining power, as well. In alcoholic patients there is an occasional fulminating pancreatitis presenting as a case of coma.

Finally, one must decide whether a spinal puncture is to be done. It should be routine in all unconscious injury cases unless the patients are in shock, in suspected strokes, convulsions, in the presence of signs of increasing intracranial pressure (such as rising pulse and blood pressure), and when patients have stiff necks, Kernig or Brudzinski signs. And of course, spinal puncture should be done if the diagnosis isn't clear by the time one has reached this point.

SUMMARY

The classical routine for diagnosis of the cause of unconsciousness has been presented once again, in a form so brief as to be almost an outline. Although the routine is approaching half a century in age, very few modernizations are required to make it conform to the best practice today.

Catastrophic Drug Reactions

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MY COLLEAGUES and I have been fortunate in not encountering many catastrophic reactions to drugs. We would like to believe that this is because of certain precautions we have taken over the years. Early frightening experiences with severe status asthmaticus that followed the inadvertent administration of acetylsalicylic acid (aspirin) to patients with asthma and nasal polyps who were sensitive to this commonly used drug led to careful questioning of each patient about this and other drug hypersensitivities. When the history of any drug allergy was obtained, we promptly stamped the words "Drug Allergy" on all parts of the patient's records to alert all concerned not to administer this particular agent; this device worked extremely well. Then, as allergic sensitivity to sulfonamides, penicillin and many other new drugs was encountered, the Mayo Clinic history records were revised to provide a special space in which to record the presence or absence of any known drug allergy and the type and severity of the reaction.

This same information about drug allergy also is recorded on the cards referring the patient to the hospital in order to alert surgeons, anesthesiologists, nurses and the staff generally, so that the offending medicament will not be administered. Each nurse who is about to give a drug to a patient for the first time is instructed to inquire of the patient about previous allergic reactions to the drug.

Before administering contrast mediums intravenously for excretory urography or cholangiography, the physician inquires regarding any allergic diseases and drug reactions, with particular emphasis on sensitivity to iodine or previous untoward experience with intravenous urography. If such a history of sensitivity or serious allergy to iodine exists, the examination is canceled. If no contraindication is elicited, the physician injects 1 or 2 ml. of contrast medium. If a reaction does not occur in about one minute, the remainder of the dose is injected. Similar precautions prevail in the investigation of the cerebrospinal system by means of contrast mediums. We are certain that many potentially serious reactions to drugs, contrast mediums and anesthetic agents have been avoided by these precautions.

CASE REPORTS

Reliable or safe tests for most kinds of drug hypersensitivity do not exist, and even a careful history will not reveal all potential allergic reactions to drugs. This is illustrated in the following two cases.

Case 1. A fifty-seven-year-old man seen at the Mayo Clinic in 1946 had passed renal stones once or twice a year during the previous five years. No history of personal or family allergy was elicited. Aside from mild obesity and minimal evidence of gout, results of physical examination were normal.

An ampule of iodopyracet (diodrast) was administered intravenously for study of the renal pelvis and ureters. The patient suddenly became dyspneic and cyanotic. The patient died despite use of artificial respiration and the administration of oxygen.

Although it was not proved, his death was attributed clinically to respiratory failure on an allergic basis. This may not be a valid conclusion, however, inasmuch as three somewhat similar catastrophies during intravenous urography were shown at necropsy to be due in two instances to cerebrovascular accidents and in the other case to coronary occlusion.

Case 2. A sixty-nine-year-old woman with asthma, nasal polyps and sinusitis gave no history of other allergic conditions, including sensitivity to either penicillin or aspirin. Results of skin tests with inhalant antigens were normal. The surgical construction of bilateral nasoantral windows with polypectomy was carried out without incident or difficulty.

The patient returned to her room after operation in good condition; she was able to get into bed with help, she spoke to her daughter, and her blood pressure was 120 mm. of mercury systolic and 80 diastolic. Procaine pencillin (300,000 units) was then injected intramuscularly. The patient died within twenty minutes despite artificial respiration and intratracheal administration of oxygen. The heartbeat was not heard. Necropsy disclosed pulmonary emphysema (grade 3), hypertrophic bronchitis and coronary sclerosis (grade 2). Death was ascribed to anaphylactic shock due to allergy to penicillin.

A more insidious yet equally catastrophic reaction to penicillin is illustrated in the next case.

Case 3. A thirty-nine-year-old housewife came to the clinic in November, 1953, because of asthma, nasal polyps and sinusitis. After construction of naso-antral windows, polypectomy and ethmoidectomy were done, radium was applied within the nose. The patient gave a history of a sensitivity reaction to penicillin G in 1950; therefore, on the assumption then held that cross reaction did not occur between penicillin G and O, penicillin O (1,000,000 units) and streptomycin (0.5 gm.) were given intramuscularly for six days after operation and apparently were well tolerated. At home in December, 1953, the patient again was given penicillin O, together with aureomycin, for pneumonia.

The patient returned to the clinic in January, 1954, and was hospitalized for six days because of erythema multiforme. Sensitivity to iodides was suspected, and this was confirmed two weeks later at home when the dermatitis recurred within hours of taking one teaspoonful of an iodide mixture.

Asthma recurred in February, and she was hospitalized for two weeks at her home town, where she received penicillin O, cortisone and other supportive measures. Evidence of polyneuritis appeared; the calves became painful, and burning, swelling and edema of the feet developed, followed by purpura and ecchymosis on the legs, arms and trunk.

In March, 1954, the patient returned to the clinic because of asthma, swollen hands, feet and joints, and purpura. The eosinophils in the peripheral blood comprised 55 per cent of the leukocytes. The erythrocytic sedimentation rate was 55 mm. during the first hour (Westergren method). There was no fever. Scratch and passive-transfer tests with penicillin gave negative results. The neurologic diagnosis was symmetric polyneuritis of allergic type. Muscle biopsy revealed the findings of periarteritis nodosa. Bone-marrow studies showed severe eosinophilia and perivascular cuffing with plasma cells.

Despite supportive measures and use of cortisone, the course was downhill. Tachycardia, hypertension, weakness, hematuria, pyuria, deep muscular aching, severe abdominal pain and a stiff

neck were outstanding. Disorientation and hallucinations were terminal symptoms one month later. Necropsy revealed periarteritis nodosa (necrotizing arteritis), small zones of hemorrhage in the intestine, kidneys, liver, lungs, spleen and heart, and large areas of hemorrhage in the brain and behind the stomach. The lungs showed bronchitis and bronchiectasis. The adrenals were atrophic.

One must conclude either that cross sensitivity was present between penicillin G and penicillin O or that hypersensitivity to penicillin O developed during the course of its several administrations. Although hypersensitivity to iodide was demonstrated in this patient, none was given during her last three months.

Reporting a nationwide survey of severe reactions to antibiotics, Welch[1] compiled a total of 1,072 reactions that were classified as being threatening to life, including among others 809 with anaphylactic shock, seventy severe cutaneous reactions, forty-six blood dyscrasias and thirty-eight cases of angioneurotic edema with cerebral or respiratory involvement; 1,925 reactions were classified as not threatening life. The preponderance of reactions followed administration of penicillin.

Bronchoscopy of patients with asthma is occasionally necessary but it is not always without hazard, as illustrated in the following instance.

Case 4. A fifty-two-year-old housewife previously had had nasal polypectomy. She came to the clinic because of asthma requiring hospitalization. No history of previous drug allergy was obtained. One month previously, corticotropin (ACTH) and prednisone (meticorten) had been administered for one week. A leukocytosis of 17,900 cells per cubic millimeter of blood, with 11.5 per cent eosinophils, was present. Results of skin tests showed sensitization to cow dander and house dust.

In preparation for bronchoscopy, 75 mg. of meperidine (demerol) hydrochloride was administered, after which the throat was sprayed with 3 ml. of a 2 per cent solution of tetracaine (pontocaine) hydrochloride and the pillars were painted with 2 ml. of a 10 per cent solution of cocaine, an equal amount of cocaine was then instilled in the trachea. The patient appeared to choke on the anesthetic material, and extremely severe asthma developed immediately, with pronounced anoxia and rapid unconsciousness. A dose of 0.5 ml. of epinephrine was given intravenously and 1 ml. also was administered intramuscularly; 50 mg. of hydrocortisone (solu-cortef) with 0.5 gm. of aminophylline also was given intravenously. This was followed by a return of consciousness and gradual recovery.

Sensitivity to pontocaine may be inferred to have been present in this instance, because five days later, after demerol sedation and with cocaine anesthesia, the patient withstood without inci-

dent the removal of a large number of polyps from both ethmoid regions, thorough ethmoidectomy, and removal of part of the cystic polypoid left middle turbinate. Both sphenoids and the right anthrum were filled with dried mucopus. A right antral window was made. In preparation for both bronchoscopy and the intranasal operations, the patient was given the usual preoperative course of cortisone customary for patients who have had previous recent steroid therapy.

The final case, which has been reported previously in greater detail,[2] illustrates a different type of catastrophic reaction to a drug, namely arsenic given in the form of Fowler's solution for the treatment of asthma.

Case 5. A thirty-four-year-old farmer was admitted to the hospital in June, 1952, because of asthma for which he had been taking a solution containing 5 gm. of arsenic per liter. On arrival he was stuporous and delirious; a stiff neck was present, with bilateral Babinski's signs. Cyanosis, wheezing rales and rhonchi were present. He was sweating and dehydrated. His temperature was 101.2° F. The urine contained 0.4 mg. of arsenic per liter. The cerebrospinal fluid was under increased pressure (480 mm. of water) and contained 8,000 erythrocytes per cubic millimeter.

His course in the hospital was stormy, but he responded to treatment, which included British anti-lewisite (BAL), ACTH, penicillin, oxygen and the usual anti-asthmatic remedies. Ten days after admission, it was noted that he was practically blind. Nine months later, his vision had improved sufficiently that he could read large letters, but he could distinguish only dark colors. Other less serious residuals from the hemorrhagic encephalitis also were present.

TREATMENT OF CATASTROPHIC DRUG REACTIONS

The physician must be ready at all times to treat allergic drug reactions quickly and effectively. Fortunately, the agents most needed to cope with such emergencies are to be found in most physicians' bags. Unfortunately, these agents are not always assembled and immediately available in hospitals and clinics. Therefore, Lofgren and I[3] have proposed and prepared emergency sets to combat anaphylaxis. These sets are placed in strategic locations in the Mayo Clinic, the Rochester hospitals, and in the research and physiology departments where one is most likely to encounter anaphylactic reactions. The sets contain two 1-ml. ampules of epinephrine (1:1,000), two ampules of aminophylline (grains 3¾ [0.25 gm.] each), one 1,000-ml. bottle of a 5 per cent solution of dextrose in distilled water, one 10-ml. ampule of diphenhydramine (benadryl) hydrochloride (10 mg. per milliliter) and one bottle of hydrocortisone (100 mg.), together with various

syringes, long and short needles, scalpel, hemostat, suture material, alcohol, sponges and a set for the intravenous administration of fluids. Other items of an emergency nature could be included but have been omitted since the primary objective is to be ready to treat anaphylactic reactions adequately and promptly. Oxygen (tank and mask) is also important and is readily available in the clinic and the hospital areas already mentioned. Most reactions encountered are mild and respond to injections of epinephrine and oral antihistaminic therapy.

Penicillinase, an enzyme that promptly neutralizes penicillin *in vivo,* is also available but has not been tested by us. Because it is said to have sensitizing potentialities,[4] its use perhaps should be reserved at present for major reactions to penicillin until its safety can be further studied.

COMMENT

Lofgren and I[3] emphasized the importance of catastrophic reactions in 1956 as follows:

"Minutes count when one is confronted with a severe anaphylactic reaction such as may follow the administration of drugs, serums, antigens, antibiotics, local anesthetics, dyes, and contrast mediums to which a patient may be hypersensitive, or such as may follow the bite of a wasp, yellow jacket, or bee to whose venom a patient is similarly hypersensitive. The suddenness, unexpectedness, and severity of the reaction are most likely to find the physician unprepared to cope with it promptly and adequately. The anaphylactic reaction may take different forms, all of which are potentially serious and include choking, cyanosis, apnea, status asthmaticus, syncope, shock, convulsions, stupor, and generalized urticaria and angioneurotic edema. The patient may die."

CONCLUSIONS

It is best to avoid giving a patient any drug to which he is known or suspected to be sensitive. Adequate tests for drug allergy do not exist. One must have ready and assembled in appropriate areas in clinics and hospitals all the medicaments and instruments necessary to combat without delay any type of reaction to drugs.

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Clinicopathologic Conference

U. S. Air Force Hospital, Sheppard Air Force Base, Texas*

MASS IN THE CHEST WITH EOSINOPHILIA

Summary of Clinical History. This 21-year-old airman was first hospitalized at Lackland Air Force Base on 1 December 1953. His chief complaint was pain across the forehead of 4 to 5 days' duration. Further history revealed that he had had a "cold" for about three weeks prior to admission, with cough, fever, and headache. There was no history of previous serious disease except for having been struck in the right eye with a rock five years prior to admission, after which an asymptomatic mass formed in the medial canthus of the eye. The patient had noted a 20-pound weight loss in the year prior to admission. He had been in the Air Force only 11 days. Prior to entering the service he had worked as a fruit picker in California.

Physical Examination. The patient was a well-developed, fairly well-nourished Negro in no apparent distress. His blood pressure was 110/80 mm Hg, his pulse rate was 80 per minute, and his temperature was 102°F. A 2-cm, hard, irregular mass was attached to the medial wall of the right orbit. A few anterior and posterior inferior cervical lymph nodes were palpable, along with one prominent, 2 cm in diameter, firm node in the right supraclavicular fossa. The inguinal nodes were enlarged. The heart and abdomen were normal. There were wheezing breath sounds in the right lung base on both inspiration and expiration.

Laboratory Findings. On admission the hemoglobin was 13 grams per 100 ml and the hematocrit was 44 ml per 100 ml. The white blood cell count was 16,500 per μl, with a differential of 3 band forms, 51 segmented forms, 16 lymphocytes, and 24 eosinophils.

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*At the time of this conference, Col. Harold F. Funsch, USAF (MC), was hospital commander. From the laboratory service, Capt. Richard G. McCleery, USAF (MC), chief.

The bleeding time was 2 minutes 8 seconds, and the coagulation time 3 minutes. The sedimentation rate was 22 mm per hour. Urinalysis was negative. The serologic test for syphilis was negative. Examinations of the stool for blood, ova, and parasites were negative. Total protein was 7.62 grams (albumin 3.81, globulin 3.81) per 100 ml. Thymol turbidity was 15 units; bilirubin, 0.54 mg per 100 ml; and cephalin-cholesterol flocculation, 3 plus in 48 hours. Multiple sputum smears and cultures for acid-fast bacilli and fungi were negative. Spinal fluid studies revealed clear fluid with 6 neutrophils and 8 lymphocytes; protein, 18 mg per 100 ml; Wassermann, negative; and cultures negative.

A roentgenogram of the chest revealed a 3.5- by 8-cm, smooth, convex mass in the right mediastinum just above the bifurcation of the trachea, and definite coarsening of the markings in the right lung base suggestive of a local pneumonitis (fig. 1). A preinduction roentgenogram of the chest (taken about 3 weeks prior to admission) was reported as negative. Roentgenograms of the skull revealed a lesion involving the right medial orbit, interpreted as an osteoma secondary to trauma.

Course in Hospital. While studies were being completed the patient continued to complain of a headache which required acetylsalicylic acid with codeine for relief. There was mild anorexia. His temperature showed daily spikes to 102°-103°F in spite of 300,000 units of penicillin twice daily. Tuberculin and histoplasmin skin tests were read as 3 plus and 1 plus, respectively. A coccidioidin skin test was negative. Agglutination studies for brucellosis were negative. Repeated blood differential counts revealed 20 to 25 per cent eosinophils. Sulfobromophthalein sodium retention was normal and alkaline phosphatase was 4.2 units.

On the seventeenth hospital day an operation was performed.

On 10 June 1954 the patient was transferred to U. S. Air Force Hospital, James Connally Air Force Base, so that he could be nearer his home. On 19 November he was transferred to this hospital (Sheppard Air Force Base) for evaluation by the Physical Evaluation Board. He died 26 February 1955 at this hospital.

DISCUSSION

Doctor Jackson:* The patient was a young Negro who entered the service 11 days before this history began. He related that he had "had a cold." The "cold" dated for approximately one month. It was manifested by cough, fever, and headache. He further recalled that in the past year he had a 20-pound weight loss, that he had no history of previous serious disease, but that he had been struck in the right eye with a rock 5 years prior to admission. I hope this latter comes under the classification of a "red herring" and would like to dispense with it now, commenting that further in the protocol there is described as palpable a 2-cm, hard, irregular mass attached to the medial wall

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of the right orbit. Later the radiologist tells us that it is his impression that the lesion in the right orbit is an osteoma, secondary to trauma. Continuing then, the writer of the protocol adds the almost innocuous bit of information that this man was a fruit picker from California. He appeared well-nourished, he had a right supraclavicular node, and there were wheezing breath sounds in the right lung base.

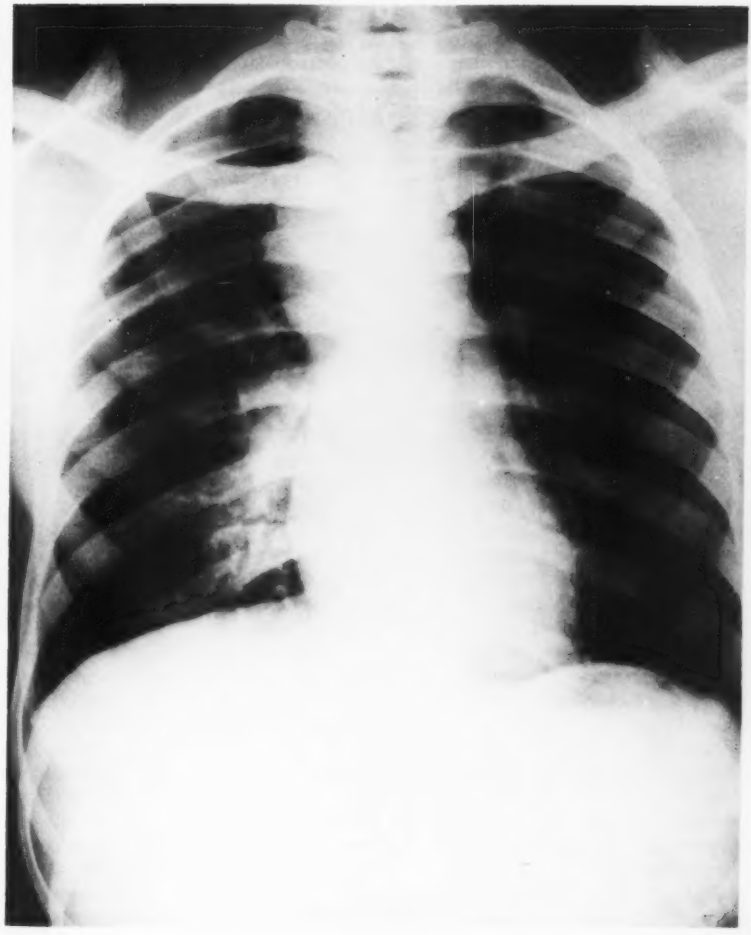

Figure 1. Roentgenogram, showing a mass in the right side of the mediastinum and coarsening of the markings in the right lung base.

In the laboratory the fact that he had two problems becomes apparent to me. First, he has an infection or infestation which has caused him to have a leukocytosis. He has 16,500 white blood cells with the dif-

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ferential of 3 band forms, 51 segmented forms, 16 lymphocytes, and 24 eosinophils. The bleeding time of 2 minutes and 8 seconds is the next bit of information supplied. Sedimentation rate is elevated to 22 mm per hour. This, again, lends credence to the theory of infection. The stools for ova and parasites were negative. The protein is abnormal; although the total quantity is normal and the serum albumin is normal, there is a definite elevation of globulin. This begins to make me believe that there is chronicity and that this man had experienced an acute episode in a chronic illness. Further, in substantiation of this feeling is the fact that the thymol turbidity is 15 units. Thymol turbidity is a reflection of beta globulins or beta globulin elevation, and an elevation from top normal of 4 to levels of 15 represents an abnormality in the globulins. The serum bilirubin, cephalin flocculation, and later on, alkaline phosphatase and sulfobromophthalein sodium retention, were all relatively normal. It is interesting that someone thought that these studies were indicated, even though they were normal. Spinal fluid studies revealed, oddly enough, findings just above those you might have interpreted as normal, and although the fluid was clear, 6 neutrophils and 8 lymphocytes were found with a low normal protein of 18 mg per 100 ml. Now, I have not seen the roentgenograms because I understand they are marked, and I would like to ask Dr. Gregory if he would present the roentgenograms for us before we continue.

Doctor Gregory:* The films of the skull show an ill-defined mass of bony density in the inner portion of the right orbit; this is probably what was interpreted as the osteoma. There is a 5 by 7 roentgenogram of the chest that was taken on 18 November 1953, during examination for enlistment, and that film was interpreted as a normal chest, with which I would agree. On 7 December 1953 the patient had a routine chest film in the hospital after being admitted for pain in the region of this osteoma. It shows a relatively large right paratracheal lymph node and an area of infiltrate extending into the right base medially. The lateral film shows the paratracheal node in the superior mediastinum. This is a relatively short time for a node of this size to have developed; however, we do know that a lymph node in the paratracheal region has to be of pretty good size before it will protrude beyond the margins of the mediastinum to where it is visible on roentgenograms. There could have been a node present that was not visible on the film of 18 November 1953 that recently enlarged. With the presence of a paratracheal node in association with a pneumonitis, there are several possibilities. Of the lymphoma group, Hodgkin's disease and lymphosarcoma can cause a parenchymal infiltrate as well as lymphadenopathy. Regarding inflammatory processes, one would expect a node area draining inflammation in the base to be in a hilar location rather than paratracheal. This could be two separate entities. This man might have a paratracheal node from say, one of the lymphomas and incidentally have contracted pneumonia, atypical pneumonia, or such. Another possibility is that of coccidioidomycosis, which can cause a parenchymal infiltrate and enlarged lymph nodes. The persistence of the pneumonitis is important in the diagnosis. Inasmuch as I am familiar with the case I won't give my first choice or preference.

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*Maj. R. D. Gregory, Jr., USAF (MC), chief, radiology service.

Doctor Jackson: I would like to ask you a few questions about the the roentgenograms: First, do you see any cavitation in the lungs? Second, is the right side of the diaphragm elevated above that which you would expect normally?

Doctor Gregory: The answer is "no" to both questions.

Doctor Jackson: Thank you, Dr. Gregory. We have heard the x-ray report and it is established that the preinduction roentgenogram of the chest is still interpreted as negative. The temperature charts showed daily spikes to 102° and 103°F. We know that the patient's temperature did not fall at the time of treatment with penicillin. Reactions to tuberculin and histoplasmin skin tests were positive (tuberculin, 3 plus; histoplasmin, 1 plus), and the reaction to the coccidioidin skin test was negative. Agglutination studies for brucellosis were negative. Here again, the finding of 20 to 25 per cent eosinophils in peripheral blood was recorded. It appears to me, that although I have been presented with a complicated problem, I have not been supplied with a complicated history. The differential diagnosis that presents in this young Negro with a pneumonitis, hilar mass, paratracheal and right supraclavicular nodes, weight loss, and laboratory evidence of chronic infection with an acute exacerbation, is likewise complicated. It is further complicated by the fact that there is an eosinophilia. Without running through the situations which can produce eosinophilia and simply trying to blanket those that I think might apply here, speculation would resolve about parasites, fungus disease, pulmonary tuberculosis, and the lymphomas. Hodgkin's disease is a definite possibility, as are other lymphomas. Eosinophilia is a well-known concomitant of Hodgkin's, but the entire illness in this man has been very brief. Admittedly, Hodgkin's can flare up like the most malignant of tumors, but it does not usually do so with a globulin increase, nor often with a leukocytosis. I admit that the diagnosis will probably come from the operation performed on the seventeenth day and think that this is fortunate. The possibility of this being another lymphoma is real. The question which I directed to Dr. Gregory concerning the elevation of the right side of the diaphragm is based simply on the fact that I have been intrigued by what would happen if a man had amebiasis with an amebic liver abscess and which then perforated through his diaphragm. This is the first time I have seen these roentgenograms. The diaphragm, as stated, is not elevated. There is no pleural effusion. History and physical examination did not reveal evidence of pain over the liver. There was no palpable evidence of hepatomegaly and, before I go on, someone will remind me that eosinophilia is unusual or not present at all in amebiasis. I recognize this, but I wonder if eosinophilia could not present with a rupture of a hepatic abscess through the diaphragm with presentation of tremendous numbers of amebas to the pleural surface.

Next in consideration, pulmonary tuberculosis and pulmonary sarcoidosis also are definite possibilities. Pulmonary tuberculosis, by odds, would run very close in likelihood to Hodgkin's in this man. His reaction to the tuberculin skin test (first strength PPD, I presume) was positive to the degree of 3 plus. This history is short. The node was not there three weeks previously. The pulmonary findings were not

there three weeks before and leukocytosis is striking. I have not ruled out tuberculosis in the presence of eosinophilia, primarily because, although rare, it is a definite possibility with systemic tuberculous infection.

Now to the more exotic illnesses, the fungus diseases. Fungus diseases are included in every differential diagnosis of eosinophilia and deserve definite consideration in a man with pulmonary infiltration and with the sudden development of a hilar node. My thinking also is colored by the apparently innocuous comment that the man had been picking fruit in California. On statistical chance histoplasmosis would come first except for the geographical note in the protocol. Histoplasmosis also would provide the possibility of a chronic illness with an acute flare. This man is a Negro. The likelihood of disseminated coccicioidomycosis in a Negro is 14 times that in a Caucasian, and it is possible that he has had his illness for a year. If *Coccidioides immitis* caused this picture, it would seem that this would not hold as an acute episode in a chronic illness, although again it is possible. There are other fungi which, although rather unusual, certainly would be worth putting into a CPC should you find them. They are *Nocardia asteroides, Cryptococcus neoformans,* and Blastomyces. All of them could produce the systemic disseminated form of fungus disease. I would, then, choose the course of trusting the history writer and say that the patient, although he could have had any of the diseases mentioned, he probably had a fungus infection. It is difficult to decide between histoplasmosis and coccidioidomycosis, but as long as I am trusting the historian, we will put coccidioidomycosis as the initial diagnosis and say that, although it could have been an acute dissemination of a chronic illness, it is not as likely as the fact that the 20-pound weight loss is a spurious account and this is an initial infection with dissemination. The negative reaction to the skin test does not bother me at all. I should like to know what the complement fixation studies showed, if they were done. The remaining fungus infections probably deserve to be placed after Hodgkin's disease which, I think, should come next, then pulmonary tuberculosis running third, with all of the others in the background.

Dr. Rosenblatt, would you like to comment on my comment?

Doctor Rosenblatt:* There is very little that I can add to this discussion because I think that Dr. Jackson has covered the subject quite thoroughly. I thoroughly agree with him in his discussion except, perhaps, that I might give these various possibilities in a slightly different order. I want to give you my reasons for it. Of course, as he said, a fungus infection is most likely and the fact that the reaction to the skin test is negative does not change the situation. A positive complement fixation test would be of greater importance because a grave prognosis would be indicated by a positive complement fixation and a negative skin test. So, if this condition is an acute exacerbation of coccidioidomycosis, these immune reaction tests would hold true and point to a grave prognosis. I think that he has skipped lightly

*Dr. William Rosenblatt, consultant in internal medicine.

over one of the possibilities that I would like to emphasize a bit, and that is Boeck's sarcoid. Now, I presume that one of the main reasons why Dr. Jackson skipped lightly over this condition is the fact that although the clinical history, physical, and some of the laboratory findings are compatible with a diagnosis of Boeck's sarcoid, this man had a positive reaction to the tuberculin test. The fact of the matter is that although Boeck's sarcoid usually presents a negative reaction to the tuberculin test, there have been definite cases reported of Boeck's sarcoid with mildly positive or moderately positive reactions to tuberculin tests so that this test in itself would not rule out the possibility. The other thing I would like to comment on is the fact that Hodgkin's is a very good possibility too. Of course, the things that would be hard to explain in Hodgkin's disease are the protein changes, that is, the high globulin and thymol turbidity and the cephalin cholesterol being 3 plus. These findings are more likely in Boeck's sarcoid and occasionally in systemic fungus infections than in Hodgkin's disease, but I do not see why it could not be possible for Hodgkin's disease to cause enough liver involvement to have altered the albumin/globulin content and thus give us these laboratory findings. I am not too impressed by the fact that the total white blood cell count is high. That sort of thing doesn't usually occur in Hodgkin's disease, but some secondary inflammatory condition could explain this. So to organize my thinking now and give you my way of looking at the diagnostic possibilities in this case, I would perhaps put fungus disease as number 3, and I would probably put the possibility of Boeck's sarcoid as number 1, and Hodgkin's disease as number 2. Yet, I realize that the insertion in the history of the fact that this man worked as a fruit picker in California where he was likely in a coccidioidomycosis endemic area might be the crux of the whole diagnosis, in which event coccidioidomycosis should take the number 1 place.

Dr. Jackson's diagnoses:

1. Coccidioidomycosis
2. ?Hodgkin's disease
3. ?Pulmonary tuberculosis

Dr. Rosenblatt's diagnoses:

1. Boeck's sarcoid
2. ?Hodgkin's disease
3. ?Fungus disease

PATHOLOGIC FINDINGS

Doctor McCleery: This protocol presented the first 17 days of what was a long and tragic illness in this young man, which ended 14 months later in this hospital in February 1955. I would like to give part of the summary of the further progress: First, the operation performed was a lymph node biopsy which showed chronic granulomatous inflammation due to *Coccidioides immitis*. This man was a fruit picker in the San Joaquin Valley. There has been some interest in the complement fixation test. This was done after the lymph node biopsy was reported and the titer was 1:512. This is interesting because a titer of 1:16 is said to indicate likely dissemination.[1] The patient, after the diagnosis

was established, received a 3-month course of 2-hydroxy-stilbamidine intravenously, during which he showed definite progression of the disease with the appearance of an osteolytic lesion in the upper humeral shaft on the right as well as subcutaneous abscesses in the right shoulder and on the back. Subsequently the patient was treated with isonicotinic acid hydrazide, also without benefit. He was transferred to still another hospital and then on 19 November 1954 he was transferred here.

At this time there were multiple ulcerated lesions of the skin over the right scapula, the right clavicle, the right sternum, the sacrum, and buttocks. There was considerable swelling and edema about the left hip with limitation of motion. There were osteolytic lesions in the right scapula, the right first, second, sixth, and seventh ribs and the left fifth and seventh ribs. There was a lytic lesion in the left ilium, and combined lytic and osteoblastic lesions in the wing of the right ilium. His care was mainly supportive although some drugs were requested from various pharmaceutical houses and used without benefit. About a month before the patient died in February of 1955 he began to have grand mal convulsions and developed hydrarthrosis of the right knee.

At autopsy, it was found that he had coccidioidomycosis of every system examined except the cardiovascular system. He had brain abscesses, the lungs were involved, and the mass in the chest was a mediastinal lymph node. The genitourinary system, the prostate, meninges, and even the thyroid gland were infected. I think that Dr. Jackson has pretty well covered or explained most of the findings in this case, but I would like to repeat several of them. When the diagnosis was made by lymph node biopsy, this man had an extremely poor prognosis for three reasons which, I think, have all been pointed out already. One was, he was a Negro. There seems to be a very definite difference between Negroes and white people when they contract this disease. The rate of dissemination in Negroes is said to be 14 times that of whites and the death rate is 23 times as great. The second thing, as also was mentioned, is the high complement fixation titer. This indicated probable widespread dissemination, which was found to be true as the disease progressed. Also another strike against the man, so to speak, and this again has been mentioned, is the fact that the reaction to the skin test was negative—and this can be a bad sign, especially if the reaction has been positive early in the disease and becomes negative. This also may mean dissemination, as some 70 per cent of patients who have dissemination will have a negative reaction to the skin test. There is a precipitin test for this disease which is specific but not prognostic. The complement fixation test titers go up rather slowly—it may be a month or so after the clinical onset of the disease—but they do have prognostic value, and also the complement fixation test will remain positive for months and perhaps years after the illness.

Pathologic diagnosis:
Disseminated coccidioidomycosis

Doctor Jackson: Did he really have a "red herring" in his eye?

Doctor McCleery: The lesion in the orbit is nebulous. I thought it belonged in the protocol because actually this man was admitted to the eye service. It was the original impression that the mass might be related to his headaches. I don't know that the roentgenogram was especially diagnostic of an osteoma. Dr. Gregory might want to say something about that. The autopsy does not clarify this. I do not believe this had much bearing on the subsequent course of the illness.

Doctor Jackson: The second question I would like to ask: Do you think that his 20-pound weight loss is accidental or a spurious account? In other words, do you think he had his illness for nearly a year before it disseminated?

Doctor McCleery: I don't know. The illness seems to have come on, at least clinically, over about a month before admission, and previous to that I can't say.

Doctor Denslow:* Dr. Gregory would you like to make any comment?

Doctor Gregory: I think that probably his disease began when he started having his upper respiratory infection. I had my three-year residency training adjacent to the San Joaquin Valley. Many of our patients came from there, and we saw quite a bit of coccidioidomycosis. It starts almost universally with an upper respiratory infection and either a mild or severe flu-like syndrome or a pneumonia-like syndrome. Probably when this patient contracted his upper respiratory infection—a bad cold he said—then his disease began. There is an incubation period of two or three weeks after the spores are inhaled and about the time he was coming into the service he may have been in the incubation stage and/or just started getting the first part of the disease. The disease can either become the mild innocuous form that is self-limiting and heals itself or it can rapidly become disseminated, which, as has been said, is 14 times more common in the Negro and, incidentally, 182 times more common in the Filipino. It seems that the dark-skinned people are much more prone to have disseminated coccidioidomycosis just as they are more prone to develop advancing forms of tuberculosis. There are three forms in which coccidioidomycosis presents itself in the lung, as most of you know: (1) the granuloma, (2) the thin-walled cavity, and (3) the persistent pneumonitis. Tuberculosis is usually the most difficult differential diagnosis to make from coccidioidomycosis. If this man had presented himself in California with a persistent pneumonitis, probably the first choice would have been coccidioidomycosis because physicians there are used to seeing it, and what you think about is what you diagnose. Actually, there are many features here that are similar to Hodgkin's disease; however, I think there is one thing that might slightly steer me away from Hodgkin's and this is the fact that there are no hilar lymph nodes that are visible. Usually with pulmonary infiltrates in Hodgkin's disease the nodes draining the involved area will be enlarged and not a node in a distant chain as this paratracheal lymph node would be. That

*Col. Joseph C. Denslow, Jr., USAF (MC), formerly chief, professional division, now hospital commander.

may not be true in all cases, but I am sure it is in the majority of cases. As far as the osteoma in the orbit is concerned, that is a very ill-defined lesion which I can't really limit on any of the films that were sent to us. Usually an osteoma is slightly more dense than the surrounding bone, and it is usually a well-defined mass. This could have been a hematoma that finally ossified and is much the same density as the bone.

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THE RIGHT TO DIE—WITH DIGNITY

As a child reading biblical stories, I was much impressed with the dignity of death: a patriarch surrounded by his children and his children's children sorrowing but eager to hear the last wise words of counsel dropping from the dying lips. What troubles me is that as a surgeon I have rarely witnessed such a scene. If a patient has a right to die as well as a right to live, he has a right to dignity in either instance. I submit that the death bed scenes I witness are not particularly dignified. The family is shoved out into the corridor by the physical presence of intravenous stands, suction machines, oxygen tanks and tubes emanating from every natural and several surgically induced orifices. The last words, if the patient has not been comatose for the past 48 hours, are lost behind an oxygen mask.—John J. Farrell: The Right of a Patient to Die. *Journal of the South Carolina Medical Association,* July 1958.

Congenital Absence of the Corpora Cavernosa

ERNST R. MOELLER, *Captain, MC, USN*

A CASE of congenital absence of the corpora cavernosa with accompanying congenital anomalies is reported because of the extreme rarity of this syndrome. A thorough review of the literature failed to elicit a single case report. Campbell[1] in his 1951 edition of *Clinical Pediatric Urology* describes the condition. One case, illustrated with its photographs, in the textbook was observed in 1950 by Colonel J. W. Schwartz, MC, USA, at Letterman Army Hospital, San Francisco, Calif. Presumably the case reported here is the second to be described in the literature.

CASE REPORT

A 5-pound 9-ounce, white male infant, was delivered of a 21-year-old primapara without difficulty. The infant was slightly cyanotic, respirations were normal, and the cry was good. The pediatric watch was called immediately after delivery because of the "peculiar appearance of the penis."

Examination revealed moderate cyanosis of lips and extremities. There was a loud, grade III, harsh systolic murmur over the precordium transmitted to both axillas. A smooth cystic mass, the size of a hen's egg, was palpated in the left lower abdominal quadrant. The penis was enlarged, pendulous, flabby, and seemed to be without substance (figs. 1 and 2). The testicles could not be palpated. A presumptive diagnosis of absence of the corpora cavernosa with probable anomalies of the upper genitourinary systems and congenital heart disease was made.

About eight hours after delivery the penis was noted to be bulbous, swollen, saccular, and filled with fluid (fig. 3). Gentle pressure on the ventral surface caused urine to be expelled from the normal presenting urethral opening. From this time until death occurred this procedure was necessary to expel the urine. Microscopic examination of this urine specimen revealed white blood cells, albumin, and granular casts. Culture was reported as showing no growth. On the eighth day of life the infant's urine still showed many white blood cells and albumin, and culture revealed *Escherichia coli*. The blood urea nitrogen was 33.5 mg. per 100 ml. The blood pressure was at all times within normal limits. The child did poorly from birth, having frequent attacks of

From U. S. Naval Hospital, San Diego, Calif.

cyanosis, occasional vomiting, poor feeding habits, increasing size of liver, and on the twenty-third day of life suddenly died.

Figure 1. Appearance of the enlarged saccular penis shortly after infant's birth.

Figure 2. Photograph demonstrating redundancy of the penis without urine in the sac.

AUTOPSY

The pertinent abnormal findings, as reported by the pathologist, are as follows:

Gross Findings. On opening the peritoneal cavity the liver was found on the right side, with the right lobe extending down to the iliac crest. There was a very soft and fluctuant mass in the left lower quadrant which pushed the viscera to the right (fig. 4).

The heart weighed 24 grams. On examining the heart in situ, transposition of the aorta and pulmonary vessel was noted. The aorta was

carrying blood from the right ventricle and the pulmonary artery was carrying blood from the left ventricle. The ductus arteriosus was patent and enlarged. The right ventricle was hypertrophied upon sectioning.

Figure 3. Bulbous penis filled with urine 8 hours after birth.

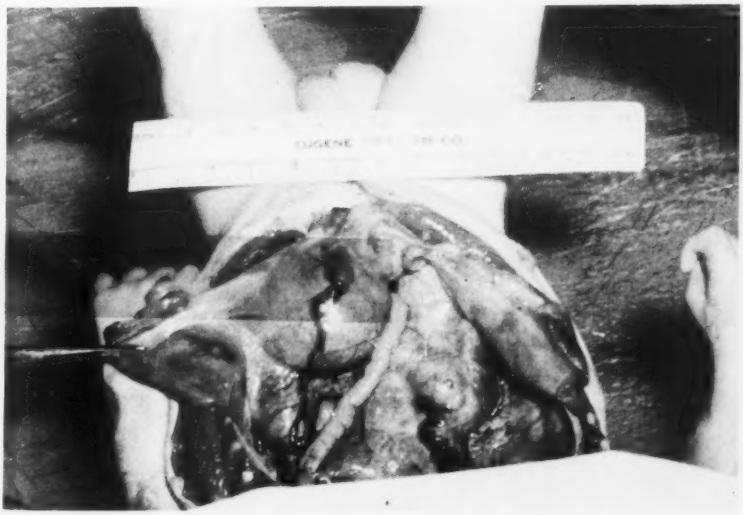

Figure 4. Post-mortem view showing markedly enlarged left ureter.

There was an interventricular septal defect and also a patent foramen ovale. The interventricular septal defect measured 2 mm. in diameter and a border of it was formed by a thin membrane which extended up towards the interauricular septum (fig. 5).

The left adrenal was enlarged, weighing 4.6 grams. The right adrenal weighed 2.1 grams. On sectioning they appeared within normal limits.

Figure 5. Heart in situ demonstrating transposition of great vessels.

The left kidney was very small, measuring 2 by 1 by ½ centimeters. Fetal lobulations were present. The capsule stripped with ease. The kidney was identified by the very small renal artery which arose from the inferior portion of the aorta. The pelvis and ureter of this kidney were markedly dilated and it was the dilated ureter which formed the mass in the left lower abdominal quadrant. The lower two thirds of the ureter was markedly dilated and thin walled. The spermatic vessels coursed over this mass. (fig. 6) Upon opening this dilated ureter cloudy white fluid was found. At the ureterovesical junction there was a marked narrowing of the ureter and a probe could not be passed into the bladder through the thickened wall. (A section of this was taken to determine if there was an opening into the bladder.) When the kidney was sectioned the parenchyma was found to be firm and the corticomedullary differentiation was poor.

The right kidney was of normal size, fetal lobulations were present, and the capsule stripped with some difficulty. Corticomedullary differentiation was fair. The pelvis and ureter were dilated, but not to the degree of those on the left (fig. 7). A probe could be passed from the ureter into the bladder. The ureter was thin walled; the lining was

smooth and it also contained cloudy fluid. The bladder wall measured 1 cm in thickness with normal appearing mucosa.

Figure 6. Entire left ureter markedly enlarged. Note small left kidney and renal artery.

Figure 7. Right hydroureter with normal size kidney and renal artery.

The prostate could not be palpated. The testes were in the abdomen overlying the dilated ureters. The penis was unusually large and the the corpora cavernosa were replaced by dense fibrous tissue. There was a large ventral sac extending from the meatus to the bulb of the urethra and connected to the bladder. It was lined by smooth epithelium, and a section of the penis was taken through the mid-portion. The corpus spongiosum was absent. The greater portion of the penis was formed by the markedly dilated urethra.

Microscopic findings. Microscopic examination of the heart revealed the myocardium, epicardium, and endocardium to be within normal limits, as were the coronary arteries.

Examination of the left kidney revealed that some of the glomeruli were within normal limits while others had markedly dilated capillaries. The proximal tubules were dilated and many contained granular debris. There was marked increase in connective tissue but very little inflammatory reaction. A few lymphocytes were scattered throughout the connective tissue. Several small areas containing cartilage were seen in this kidney. The right kidney contained normal glomeruli. Many of the tubules contained neutrophils and eosinophilic granular debris. There was an increase in the interstitial connective tissue. Lymphocytes and neutrophils were scattered throughout the interstitial tissue. The calyces and pelvis showed transitional epithelium with papillary outgrowths and there was a purulent exudate within the lumen of the pelvis.

The wall of the bladder was greatly thickened by hypertrophied muscularis. The mucosa was formed by transitional epithelium which was within normal limits. Sections revealed a small-calibered tortuous opening in the portion taken from the left ureterovesical junction.

Sections taken from the dilated urethra revealed the outer surface to be lined by keratinized, stratified epithelium, and the inner surface was lined by squamous epithelium in which no keratinization was present. Between these two layers there was dense connective tissue in which many blood vessels were seen. The section taken from the area usually occupied by the corpora cavernosa contained a large vessel in which there was a thrombus with calcification in the central portion of the thrombus. Many vessels were seen but few areas of erectile tissue were found.

Diagnoses:

1. Congenital heart disease
   a. Transposition of great vessels
   b. Interventricular septal defect
   c. Widely patent ductus arteriosus
   d. Hypertrophy, right ventricle
2. Hydroureter, bilateral
3. Pyelonephritis, chronic, left
4. Pyelonephritis, acute, right
5. Absence, congenital, corpora cavernosa
6. Hypogenesis, left kidney
7. Absent prostate
8. Bilaterial hydronephrosis
9. Hypertrophied left adrenal

COMMENT

Presumably in this case there was an absence of mesenchymal tissue differentiation in the urogenital plate with resultant absence of the corpora cavernosa.[2]

Because of the similarity of the co-existing malformations found in this case and in the one mentioned by Campbell, it can be presumed that this is a distinct clinical entity. Malformations common to both cases were (1) absence of the corpora cavernosa, (2) hydronephrosis, (3) agenesis or hypogenesis of one kidney, (4) absent prostate, (5) abdominal testes, (6) hypertrophied adrenal, and (7) ureterovesical junction fibrous obstruction.

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AFTER CARE OF HEART SURGERY

Of all the aspects of intracardiac surgery the postoperative management is the most important. The patient is weighed in the operating room preoperatively for comparison with the postoperative weight; this gives one a fairly good appraisal of where one stands relative to blood volume, and any gross deficit is corrected. Usually we have tried to stay approximately even, although it is often obvious that a positive blood balance is required. During the first 48 hours we endeavor to replace, steadily, what is lost in chest drainage. Fluids are given at a rate of 400 ml per square meter the first 24 hours, and 800 ml per square meter thereafter. When any acidosis is detectable one unit of molar sodium lactate is given. Greatest care is given to maintaining an adequate respiratory exchange, for these patients can slip into respiratory acidosis very quickly. Directly after operation, and while the patient is being established in the recovery unit, supported respirations are maintained by the anesthetist until the patient no longer will tolerate the intratracheal tube. Thereafter, an oxygen tent is used. Whenever there is any question about respiratory depression, the nurse is instructed to require the patient to take deep breaths, at times through an oxygen mask. There are occasions when tracheotomy and mechanically assisted respirations are necessary.—Frank Gerbode: Some Experiences With Intracardiac Surgery. *Surgery*, January 1959.

Acute Spinal Epidural Abscess

R. THOMAS HOLZBACH, *Captain, USAF (MC)*

NONTUBERCULOUS epidural abscesses are of relatively rare occurrence. A perusal of the literature, however, shows that increasing awareness, especially within the last decade, has now brought the percentage of successfully diagnosed and treated cases to between 80 and 90 per cent, and the total number reported to well over 300. That this recognition is a recent phenomenon is attested to by Woltman and Adson's article[1] some thirty years ago reporting the total literature of 29 cases with but one survival and only two cases diagnosed ante mortem. The influence of Dandy's[2] emphasis on early surgical intervention, plus antibiotics, are no doubt accountable for the dramatic improvement in mortality and decrease in morbidity. This fact, however, places a heavier responsibility on the physician who first sees such a case, because the diagnosis is easily overlooked if not considered, and it has been shown that total neurologic recovery is possible only when treatment has been started early. Toward the goal of aiding earlier recognition, this case is hopefully presented as illustrative of the diagnostic pitfalls which may lurk in a disease of such protean personality.

CASE REPORT

A 39-year-old man entered the orthopedic service of this hospital with the chief complaint of low back pain of one week's duration. He had squeezed a furuncle on his left forearm two weeks prior to entry, and one week later began to have symptoms. The latter began as a dull ache in the left costovertebral angle and soon moved to the paravertebral region of the third lumbar vertebra, accompanied by the onset of chills and low-grade fever. There was mild radiation of pain to the back of the thighs. The patient later noted urinary frequency and nocturia, but without dysuria. Shortly before entry, the patient complained of occasional twitching and weakness in the thigh muscles.

Physical examination disclosed a well-developed and well-nourished, slightly obese, 39-year-old man, 6 feet in height and weighing 200 pounds. He appeared acutely ill. His temperature was 102.4°F; pulse rate, 88 per minute; and his blood pressure was 130/90 mm Hg. Positive findings included moderate bilateral costovertebral angle tenderness

From U. S. Air Force Hospital, Mountain Home Air Force Base, Idaho.

and marked tenderness over the spines of third and fourth vertebrae. Questionable weakness of the quadriceps was elicited, but this was thought related to the patient's toxicity. No evidence of fibrillation, atrophy, motor or sensory loss was found on neurologic examination. Kernig and Brudzinski signs were negative. Leg raising was normal and deep tendon reflexes were symmetrical.

The patient's hemoglobin was 12 grams per 100 ml. The initial leukocyte count was 19,000 per μl, with a left shift in the differential cell count. Nonprotein nitrogen was 40 mg per 100 ml. Creatinine was 1.5 mg per 100 ml. Urinalysis was initially negative except for a trace of albumin, but on the fourth day was loaded with pus cells. Febrile agglutinins and blood cultures were negative. Roentgenologic studies of the lumbosacral spine showed minimal narrowing of the third lumbar interspace. Roentgenograms of the chest and abdomen were negative. An intravenous pyleogram showed impaired renal excretory function with megaloureter bilaterally, but with no evidence of obstruction.

The patient frequently complained of aching pains in the thigh and lower legs, but no objective findings were to be noted. He was seen in consultation and several diagnoses were offered, with tuberculous abscess, pyleonephritis, perinephritic abscess, Pott's disease, and poliomyelitis given most serious consideration. Suddenly on the fourth hospital day, the patient developed complete flaccidity of the lower extremities and incontinence of urine and feces. Urethral catheterization showed a residual volume of 950 ml. Neurologic examination revealed almost complete paralysis of the hip flexors and hamstring muscles on the right, and complete paralysis on the left. Distally, motor involvement was less. The patellar tendon reflexes were absent, but the Achilles were intact. A spinal tap revealed gross pus on entering the epidural space, establishing the now suspected diagnosis. The patient was taken immediately to surgery, where a laminectomy of the first through the fourth lumbar vertebrae was performed. The abscess was found enclosed in a fibrous sac, the ligamentum flavum being scarred and adherent to the epidural wall. Culture showed the causative organism was *Micrococcus pyogenes* var. *aureus (staphylococcus aureus)* (coagulase-positive). The sac was debrided and removed, the wound packed, and open healing allowed. The patient was placed on antibiotics. The immediate postoperative course was uneventful. Two and one-half months later on active physical therapy he was ambulatory with a slight trace of spastic gait and slightly increased Achilles tendon reflex with unsustained clonus on the right.

Comment. The reasonable, yet mistaken, diagnoses of tuberculous abscess, pyelonephritis, and perinephritic abscess were made during the phase before neurologic signs and symptoms seemed consequential. Yet the very fact that such symptoms were present argues, in retrospect, the possibility that the diagnosis could have been made at a somewhat earlier hour. The multiplicity of false leads, urinary symptoms, and pyuria are not at all surprising when one considers the anatomy of the lesions. The furuncle preceding his illness, implying metastatic

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origin, has been reported to occur in as high as 75 per cent of cases.[3] The causative organism, *M. pyogenes* var. *aureus*, in this case was the same as in over 90 per cent of the cases reported. Other organisms, such as pneumococcus, streptococcus, *Salmonella typhosa, Psuedomonas aeruginosa,* and as diverse as *Coccidioides immitis,* occasionally have been found. Furuncles and infected operative sites are believed to be the most common foci for metastatic spread. The case herein cited followed the pattern, first emphasized by Hulme and Dott[4] in their series, of rapid and almost fulminant development of complete loss of cord function in a surprisingly short time (often under 24 hours) after the first development of noticeable neurologic signs. One of the most common of the latter is impaired bladder function.

DISCUSSION

The earliest known report of nontuberculous epidural abscess was a citation of a possible case by Brera[5] in 1810 in the report of Abercrombie in 1826.[6] The entity was still little known in 1900 when Chiari[7] discussed metastatic abscess. Cavazzani's[8] case of 1899 was the first reported surgical success, but it was not until Dandy's[2] reported salvage of 2 of 25 acute cases in 1926 by surgical intervention and his plea for its use that this form of therapy became regularly attempted. Mixter and Smithwick[9] in 1932 reported their three surgical survivals after a report of another case the preceding year, but mortality was astonishingly high. Browder and Meyers,[10] in an exhaustive review of the literature in 1937, were able to gather 95 known cases, not all of the acute variety, and summarized the then current knowledge. In the score of years since then, several excellent discussions have appeared in the literature.[3, 4, 11] Acute epidural abscesses are found anatomically largely dorsal to the spinal cord because of the almost total lack of an anterior epidural space between the first cervical and the second sacral vertebrae. This is due primarily to the close attachment of the spinal dura anteriorally to the posterior aspect of the vertebral body. This also accounts for the tendency of the abscesses to spread axially, although they are usually restricted to a few vertebral segments. Acute anterior spinal abscesses are seldom encountered, usually being chronic in this location and related to some tuberculous or other juxtaposed osteomylitic lesion. Some physicians believe that in nonmetastatic cases, injury is likely to be a factor, with hematoma formation providing a focus of minimal resistance and culture media for the growth of organisms.[10]

The clinical picture, not always typical, has been well described by previous authors. One group[4] delineated its most typical pattern as follows: (1) spinal ache; (2) nerve root pain; (3) impairment of cord function; and (4) complete paralysis. Evidence of spinal cord compression in the face of either local or constitutional signs of infection is sufficient to warrant consideration of the

diagnosis. The most common neurologic symptoms include anesthesia, areflexia, and progressive flaccid paraplegia.

Early spinal tap may show evidence of subarachnoid block, and further information can often be gained by myelography. Up to several hundred leukocytes, mostly neutrophils, can be found in acute cases, but no other changes are usually found in the spinal fluid. As in this reported case, frequently, through careful insertion of the spinal needle, the abscess sac can be entered without spreading infection, and the diagnosis more definitely established.

The several series which have been reported since the advent of widespread use of antibiotics all reflect the same profound change in surgical mortality with at least some neurologic recovery, except in far-advanced cases. The number of reported cases also speaks for the increased ante-mortem recognition of the condition not reflected in the earlier literature. Huesner[3] reported that total recovery in his patients occurred when either no paresis existed at surgery or it had been present less than 36 hours. The most common present surgical approach includes laminectomy with careful dissection for complete removal of the abscess sac and delayed closure with the use of the appropriate adjuvant antibiotics. A surgical emergency must be considered to exist, and under no circumstances should the use of antibiotics alone be considered an alternate mode of therapy.

SUMMARY

An unusual diagnostic problem of acute spinal epidural abscess is presented. The diagnosis was finally suspected from evidence of sepsis combined with rapid significant development of neurologic signs and symptoms. Therapy. consisting of surgical laminectomy with open drainage and antibiotics was successful. A plea for urgent diagnostic approach toward such a problem is made inasmuch as the favorable influence of early therapeutic intervention is pointed out.

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THE CHALLENGES OF MEDICARE

Evidence is available substantiating the belief that the Dependents' Medical Care Program is rendering medical care to those who could not reasonably obtain this service in hospitals of the uniformed services. In general, the program has had excellent reception by the physicians of the United States. However, it presents a distinct challenge to local medical associations in their own operational responsibilities in the areas of schedules of allowances and their utilization. It also presents a real challenge to the uniformed services medical facilities in improving care for dependent patients . . . . The Office for Dependents' Medical Care will continue to try to administer the program with the interests of all the uniformed services and all the physicians and hospitals of the nation in mind in an endeavor to render medical service to dependents of the active members of the seven uniformed services in conformance with the desires of Congress.—Paul I. Robinson: Experience With Medicare. *Journal of the American Medical Association*, 22 November 1958.

ADMIRAL HOGAN REAPPOINTED, TO SERVE AS NAVY SURGEON GENERAL UNTIL 1961

The reappointment of Rear Admiral Bartholomew W. Hogan, MC, USN, as Surgeon General of the Navy and Chief of the Bureau of Medicine and Surgery for a period of two years, was confirmed on 6 February 1959, by the U. S. Senate. The new two-year term will extend Admiral Hogan's tenure of office as Head of the Navy Medical Department to 15 February 1961.

Admiral Hogan

Initially appointed in this capacity on 15 February 1955, for a four-year term, he was nominated for reappointment by President Dwight D. Eisenhower on 12 January 1959.

Appointed a lieutenant, junior grade, in the Medical Corps of the Navy on 6 June 1925, Admiral Hogan was promoted to rear admiral on 9 August 1952, with rank to date from 1 April 1952. As a commander during the early months of World War II, he served as senior medical officer in the U. S. S. *Wasp,* and was aboard that carrier when she was torpedoed in South Pacific waters by a Japanese submarine on 15 September 1942. Badly damaged by fires and explosions, and after all damage control had failed, the abandon ship order was given. For heroic service during this action, he was awarded the Silver Star Medal, and later the Navy and Marine Corps Medal while on board the destroyer, U. S. S. *Duncan.*

Following World War II Admiral Hogan commanded the U. S. Naval Hospital, Bethesda, Maryland; the U. S. Naval Hospital, Mare Island, California; and the U. S. Naval Medical School, Bethesda, Maryland. He served as chief of staff for medical matters to the Commander in Chief of Pacific areas at the end of the Korean War.

In addition to the Silver Star Medal and the Navy and Marine Corps Medal, Admiral Hogan has the Purple Heart Medal; the American Defense Service Medal with star; the American Campaign Medal with two stars; the Asiatic-Pacific Campaign Medal with four engagement stars; the World War II Victory Medal; and the National Defense Service Medal.

SIX MEDICAL OFFICERS NAMED COMMITTEE CHAIRMEN BY AERO MEDICAL ASSOCIATION

Six Medical Corps officers of the Navy and Air Force have been named chairmen of important committees for the forthcoming thirtieth annual meeting of the Aero Medical Association at the Statler Hilton Hotel, Los Angeles, April 27-29, by Brigadier General M. S. White, USAF (MC), president of the society.

The officers include Brigadier General Don Flickinger, USAF (MC), chairman of the scientific program committee; Colonel George B. Green, USAF (MC), international committee; Colonel Harry G. Moseley, USAF (MC), scientific exhibits committee; Captain Raphael L. Weir, MC, USN, entertainment committee; Captain Carl E. Wilbur, MC, USN, technical exhibits committee; and Colonel Robert J. Benford, USAF (MC), publicity committee.

The extensive scientific program includes presentations by a number of Department of Defense medical officers and civilian scientists from the Navy and Air Force schools of aviation medicine and related research laboratories. Field trips to many of the flight test facilities in the Los Angeles area are being planned for those attending the meeting.

Captain Clifford P. Phoebus, MC, USN is chairman of the Space Medicine Branch of the Association. Among the chairmen of the standing committees for 1958-1959 are Rear Admiral B. Groesbeck, Jr., MC, USN (Ret.), nominations committee; Captain Frank B. Voris, MC, USN, membership; Major General Dan C. Ogle, USAF (Ret.), resolutions; Brigadier General Albert H. Schwichtenberg, USAF (Ret.), safety and health; and Colonel Harry G. Moseley, USAF (MC), military flyer subcommittee.

At the annual business meeting on 28 April, members of the society will vote on the proposal to change the name to the Aerospace Medical Association, as recommended recently by the executive council.

Gen. Flickinger

Col. Green

Col. Moseley

Capt. Weir

Capt. Wilbur

LINCOLN DEATH SCENE. Mrs. Elizabeth F. Bready, head of the periodical department, New York Academy of Medicine, receives a copy of the famous Lincoln deathbed scene originally drawn by her grandfather, Hermann Faber. Making the presentation are (left) Captain William M. Silliphant, MC, USN, director of the Armed Forces Institute of Pathology, and Colonel Albert E. Minns, Jr., MSC, USA, curator of the Institute's Medical Museum. As an artist on the staff of the Museum during the Civil War, Faber made many illustrations, the most noteworthy of which was his interpretation of the deathbed scene, now on display at the Museum. He also was illustrator for the six-volume *Medical and Surgical History of the War of the Rebellion,* which was completed in the 1880's and is also on display at the Museum.

MEDICINE IN MISSILE OPERATIONS

Fifteen senior medical officers of the military departments in December attended the first course in the medical aspects of missile operations at the Air Force Missile Center, Patrick Air Force Base, Florida. The two week course, sponsored by the Air Research and Development Command, was directed by Colonel George M. Knauf, USAF (MC), Director of the Occupational Health Research Laboratory at the center. The course will be repeated in April and June.

DR. MOSTOFI HONORED. Dr. Fathollah K. Mostofi, scientific director of the American Registry of Pathology, Armed Forces Institute of Pathology, (center), is presented a letter of appreciation from the Secretary of Defense by Dr. Frank B. Berry, Assistant Secretary of Defense (Health and Medical) as Captain William M. Silliphant, MC, USN, director and commanding officer of the AFIP, looks on. The letter was presented to Dr. Mostofi for his "superior accomplishments in the successful progress of the Joint Committee on Aviation Pathology," while serving as the secretary of the Committee. The presentation was made on 19 January at the Institute.

BLOOD FACILITIES LOCATOR PUBLISHED

The first comprehensive directory of blood facilities and services ever compiled in this country has been released by the Joint Blood Council and distributed to all institutions and organizations that participated in its preparation, including the Army, Navy, and Air Force medical installations. The directory locates facilities, lists services, and supplies information for physicians, hospital staffs, and others associated with the practice of medicine. A number of the 2,202 facilities listed are jointly engaged in other activities, including the maintenance of artery, eye, bone, skin, and mother's milk banks. More than half store whole blood, record donors' histories, recruit donors, and complete laboratory blood processing. The directory is now available for $1.50 from the Joint Blood Council, 1832 M. Street, N. W., Washington 6, D. C.

NEW DEPUTY CHIEF USAF NURSE CORPS

Lieutenant Colonel Dorothy N. Zeller has been named deputy to Colonel Frances I. Lay, chief of the U. S. Air Force Nurse Corps. A native of Fort Washington, Maryland, with 22 years of continuous active duty, Colonel Zeller has served as chief nurse of two field hospitals in Germany and of the Alaskan Air Command. She received her B. S. degree in Nursing Education from the University of Maryland, is a graduate of the hospital administration course, Medical Field Service School, Fort Sam Houston, Texas, and attended the flight nurse course at Gunter Air Force Base, Alabama. She replaces Lieutenant Colonel Ethel R. Kovach, who will take additional training in nursing education at Catholic University in Washington, D. C.

Colonel Zeller

U. S. SUPREME COURT ADMITS COL. WESTRA

Colonel Donald F. Westra, USAF (MSC), executive officer for the Surgeon General of the Air Force, was recently admitted to the bar of the United States Supreme Court. He was graduated in 1954 from St. Mary's University, San Antonio, Texas with a Bachelor of Laws degree and is licensed to practice law before the Supreme Court of Texas, the District of Columbia Courts, the U. S. Court of Appeals, and the Military Court of Appeals. He previously attended the University of Maryland and Georgetown University Law School. Prior to his present assignment Colonel Westra served as director of administration at the U. S. Air Force School of Aviation Medicine, Randolph Air Force Base, Texas.

Colonel Westra

NAVAL OFFICER NAMED TV CONSULTANT

Lieutenant Commander Edward W. Bird, MC, USN, television projects officer for the National Naval Medical Center, Bethesda, Maryland, has been appointed the first consultant in medical television to the George Washington University School of Medicine. Associated in the making of a series of medical films for the Navy from 1954 to 1956, Dr. Bird studied television production at the University of Southern California and prior to attending medical school was employed as an optical engineer. He received his medical degree from the University of Rochester School of Medicine and Dentistry in 1948 and completed his naval medical internship at the U. S. Naval Hospital, Long Beach, California, in 1949.

Commander Bird

CAPT. SMITH HEADS ACCELERATION LAB

Captain F. Kirk Smith, MC, USN, has been named director of the Aviation Acceleration Laboratory of the U. S. Naval Air Development Center, Johnsville, Pa., succeeding Captain Herbert G. Shepler, MC, USN, who retired on 30 December after completing 30 years of naval service. Captain Smith, twice decorated for heroic achievement during action against the Japanese in World War II, has recently completed a tour of duty at the Naval Air Station, Kodiak, Alaska, where he also was staff medical officer of the Alaskan Fleet Air Wing and medical officer of the Seventeenth Naval District.

Captain Smith

DR. STRUGHOLD GIVEN JEFFRIES AWARD

Dr. Strughold

One of the highest and most coveted awards in the field of aerospace medicine has been presented to Dr. Hubertus Strughold, advisor for research and professor of space medicine at the U. S. Air Force School of Aviation Medicine. Named 1958 winner of the John Jeffries Award of the Institute of the Aeronautical Sciences, Dr. Strughold is the eighteenth scientist to receive the award and the fifth member of the School of Aviation to be so honored. Presentation of the award was made at the Institute's annual meeting in New York in January. Often called the "father of space medicine," Dr. Strughold was the first scientist to define specific areas to be investigated in space medicine, the first to give a comprehensive definition of space and space equivalency, and was the first chief of department (now division) of space medicine.

LETTERMAN ARMY NURSE GIVEN AWARD

Major Ruth Edenfield, NC, USA, Letterman Army Hospital, San Francisco, Calif., has been named the second recipient of the Evangeline G. Bovard Award. The presentation was made by Colonel Robert Skelton, USA (Ret.), who established the award to perpetuate the memory of his wife, an Army Nurse with an outstanding record of service before and during World War II. Major Edenfield was cited for her excellence of service and high degree of professional competence in maintaining the superior standards of the Army Nurse Corps. She is head nurse of the medical service of the hospital. The award is the first of its kind honoring an Army nurse for professional achievement.

MILITARY SANITARY ENGINEERS CERTIFIED

The American Sanitary Engineering Intersociety Board has announced the certification of 15 Army and Air Force Medical Service Corps officers, who have qualified for membership in the American Academy of Sanitary Engineers. U. S. Army: Colonels Ralph R. Cleland, Raymond Karpen, Stanley Weidenkopf, and Fenner H. Whitley; Lieutenant Colonels Floyd L. Berry, Robert G. McCall, and Marlo E. Smith, and Major John Redmond, Jr. U. S. Air Force: Colonels Jack G. Carmichael and Alvin F. Meyer, Jr., and Lieutenant Colonels Cardis W. Bryan, Charles C. Dills, John F. Pierce, Juan M. Ramos and Francis S. Smith.

ARMY SURGEON GENERAL ANNOUNCES SHORT POSTGRADUATE COURSES IN APRIL AND MAY

Ten postgraduate professional short courses for Army Medical Service officers are announced for the fourth quarter of fiscal year 1959. Interested officers who are eligible to attend should apply through channels to The Surgeon General, Department of the Army, Washington 25, D. C. Attention: MEDCN-CG. Navy and Air Force officers should apply through their respective surgeons general. Descriptions of the courses follow:

Prosthodontics—Letterman Army Hospital, San Francisco, Calif., 6-10 April 1959; Walter Reed Army Medical Center, Washington, D. C., 1-5 June 1959.

The purpose of the course is to provide a comprehensive review of the principles and practice of prosthodontics. It is designed for dental officers assigned or who may be assigned to a dental prosthetic service. Examinations, diagnosis, treatment planning, and prognosis for complete and partial dentures are stressed. Special attention will be given to preparation of the mouth, for partial dentures, surveying, and designing. Considerable attention is directed to immediate dentures, impressions, master casts, jaw relationship records for complete and partial dentures. Selection, arrangement, and articulation of artificial teeth to develop esthetics and phonetics are presented. Table clinics and patient demonstrations will be included, utilizing color television as a teaching aid.

Surgery in Acute Trauma—Tripler Army Hospital, Honolulu, T. H., 6-10 April 1959; William Beaumont Army Hospital, El Paso, Texas, 7-9 April 1959.

This course covers the important aspects and methods of handling patients subjected to various types of trauma, and includes consideration of such subjects as triage, the shock state, control of hemorrhage, debridement, management and transportation of the wounded, principles of treatment of bone and joint injuries, abdominal and chest injuries and head injuries.

Cardiovascular Pathology Seminar—Armed Forces Institute of Pathology, Washington, D. C., 6-10 April 1959.

This course is designed primarily for pathologists, cardiologists, and clinicians interested in the peripheral vascular diseases. The course will begin with a basic lecture on the embryology, anatomy, histology, physiology, and biochemistry of the heart on the first day, to be followed by a symposium on congenital heart disease on the second day. The third day will be highlighted by a discussion of the clinical, etiologic, and pathologic aspects of rheumatic heart disease. The fourth day of the course will be devoted to a study of the peripheral vascular diseases. The final session will be devoted to the

tumors and cysts of the heart with discussions from the radiological, surgical, and pathologic aspects of the various lesions. The course will be limited to 150 participants.

Physiological Considerations in Surgery—Walter Reed Army Medical Center, Washington, D. C., 6-11 April 1959.

The course will embrace a concise coverage of general, cardiovascular, thoracic, and other major surgical specialities. The physiologic concepts applicable to these areas will be emphasized and particular attention devoted to the requirements in specialized areas. Electrolyte, fluid, and blood requirements in surgery will be detailed. Metabolic considerations and their application to surgical problems will be stressed. Physiologic considerations in surgical diseases of the gastrointestinal tract and their relation to surgical procedures will be emphasized.

Oral Surgery—Letterman Army Hospital, San Francisco, Calif., 20-24 April 1959.

This course is designed to present current concepts of treatment in minor oral surgery, traumatic injuries, and emergency treatment of mass casualties. It is suitable for officers who are partially trained or who feel the need of a refresher course.

Management of Mass Casualties—Brooke Army Medical Center, 27 April-1 May 1959, Brooke Army Medical Center, San Antonio, Texas, 15-19 June 1959.

The purpose of the course is to indoctrinate officers of the military medical services in current concepts on the management of casualties resulting from the employment of nuclear weapons. The objective of the course is to provide current, up-to-date information of an unclassified nature on the medical aspects of nuclear warfare, to reduce this information to readily accessible and useful data in the solution of problems which might arise, and to stimulate thinking on ways of coping with the problem of casualties which might result from nuclear weapons employment.

Institute for Army Medical Specialist Corps Officers—Walter Reed Army Medical Center, Washington, D. C., 10-16 May 1959.

This institute is designed to provide opportunity for officers to meet concurrently in their separate professional sections to review and discuss current professional trends, administrative, supervisory and training responsibilities and procedures. Current Army administrative policies, procedures, regulations, and their implementation will be discussed. Planned as a workshop, this institute will include sessions in which factors pertinent to personnel relationships will be discussed. Emphasis will be directed toward improving leadership skills and supervisory practices in staff development.

Radiological Health for Sanitary Engineers—Walter Reed Army Medical Center, Washington, D. C., 11-22 May 1959.

This course is planned to acquaint sanitary engineers with the hazards and uses of ionizing radiation and radioactive fallout as a contaminent of air, water, and food. Problems of disposal of radioactive wastes resulting from wartime and peaceful uses of radiation also will be considered. The course will consist of lectures, problems, discussions, and laboratory exercises.

Oral Diagnosis and Therapeutics—Walter Reed Army Medical Center, Washington, D. C., 18-22 May 1959.

This course is designed to provide a review and refresher experience in the present concepts and advances in the diagnosis, treatment planning, and therapy of oral diseases. Importance of the principles and methods of diagnosis is stressed as well as such aspects of oral medicine and physiology which are fundamental to the planning of treatment for oral diseases and oral dysfunctions. The course includes the recognition of oral abnormalities of local, systemic, and developmental origin as well as the clinical and histopathologic aspects of oral disease. Special emphasis is placed on the diagnosis of periodontal conditions and treatment of mass casualties. Table clinics and patient demonstrations will be included, utilizing color television as a teaching aid.

Advanced Military Nursing—Brooke Army Medical Center, San Antonio, Texas, 18-29 May 1959.

This course will include newer trends of practice in clinical nursing; principles of administration and supervision and their application; principles and methods of teaching; analysis of nursing care; in-service and on-the-job training; communication channels and media; role of the head nurse and some studies in this area; the clinical technician—his role and the preparation and responsibilities of the Army Nurse Corps officer working with him; human relations; work simplification and job analysis; staffing; personnel management and utilization; and the role of the Army Nurse Corps officer in relation to the organization of nursing service.

OFFICIAL DECORATIONS

The following awards were recently announced by the Departments of the Navy and the Air Force.

Legion of Merit

Ralph M. Lechausse, Col., USAF (MC)

Navy Commendation with Metal Pendant

Richard H. Tabor, Lt., MC, USN

A Message From the A. M. A.

An opinion survey among physicians being released from active military service has been conducted by the Council on National Defense of the American Medical Association since 1952. The questionnaire used in the survey is primarily designed to obtain pertinent data based on the physician's observations and opinions, while in the Armed Forces, concerning the utilization of physicians and the medical staffing conditions in the uniformed services. The questionnaire also elicits comments and suggestions as to further improvement of military medical services as well as ways and means whereby organized medicine can be of greater assistance to military physicians.

This report covers the period 1 January 1957 to 31 December 1957. During that period the Council sent out 2,055 questionnaire forms. Of these, 1,167 were completed and returned, representing a 57 per cent response.

Age Distribution of Responding Physicians. About 79 per cent (923) of the physicians replying were nearly equally divided between the 25-29 year age group (463) and the 30-34 year age group (460). In the 35-39 year age group there were 163 (14 per cent) of those responding.

Date of Graduation From Medical School. More than half of the responding physicians (64 per cent) were graduated from medical school in 1950 or subsequent to 1950. The second largest group, about 27 per cent, graduated during the period 1945-1949. None failed to indicate the year of graduation from medical school.

Years of Residency Training. The largest group (408 physicians, or about 35 per cent of those replying to this question) had no residency training, while the second largest group (258 physicians, or 22 per cent) had but one year of residency training at the time of entrance on active duty. There were 154 (13 per cent) who had two years; 182 (16 per cent) who had three years; and 110 (9 per cent) who had four years of residency training.

Occupation at Time of Entering Service. The largest groups of physicians who served in the Army, Navy, and Air Force (33, 45, and 46 per cent, respectively) were in residency training at the time of entrance on active military duty. The second largest group in all three services (30, 18, and 16 per cent, respectively, for Army, Navy, and Air Force) were in specialty practice. The summary report for the year 1956[1] showed that the largest groups in the Army and Navy were engaged in general practice prior to active military service, while the largest group in the Air Force was in internship.

From the Council on National Defense of the American Medical Association. The views and opinions expressed are not necessarily those of the Department of Defense. —*Editor*

Number of Physicians Holding Board Certificates. Of the 209 physicians who have board certificates, 78 were in the Army, 42 were in the Navy, and 89 were in the Air Force. The specialties covered over 15 different fields, of which the largest were internal medicine (34) and surgery (34). The second largest was radiology, and the third largest was pediatrics. In the previous report, for the year 1956, internal medicine was first, followed by surgery and pediatrics. By branch of service, a total of 25 per cent of those responding in the Army, 15 per cent of those in the Navy, and 16 per cent of those in the Air Force had specialty board certificates.

Government Medical Education Received. A total of 193 of the 1,167 physicians responding stated that they had received assistance from the Federal Government in their medical education, while 974 indicated they had received no Government assistance. The largest single group receiving Government assistance was under the Army Specialized Training Program. The next two largest groups were under the Navy V-12 Program and the GI Program. Of the responding physicians, 78 per cent of those who served in the Army, 84 per cent of those in the Navy, and 86 per cent of those in the Air Force received no Government assistance.

Training Received While in Service. There were 600 of the physicians responding who received military medical training while on active duty in the Army, Navy, or Air Force. The Medical Field Service School accounted for 401, the largest number, while 202, the second largest group, received training at the School of Aviation Medicine. In the Army group, about 85 per cent received the Basic Course training of the Medical Field Service School, as did 3 per cent of those in the Navy and 16 per cent of those in the Air Force.

Physicians' Evaluation of Military Training. The great majority of physicians filling out the questionnaire thought that all important features of military training had been satisfactorily covered. For the Army, 83 per cent were satisfied with the training, while 69 per cent of those in the Navy and 80 per cent of those in the Air Force were satisfied. A small percentage indicated that the training was unsatisfactory, but gave no specific reasons. Others stated reasons why they considered their tour of service unsatisfactory. Most of these physicians in all branches of the service reported insufficient basic orientation and indoctrination and insufficient training in military customs, administration, and regulations, in that order, as unsatisfactory aspects of military training.

Physicians' Evaluation of Assignment. The majority of responding physicians stated that their longest and next longest assignments were almost completely, or partially but satisfactorily, in line with their training and experience. With respect to the longest assignment, 78 per cent of the Army physicians, 68 per cent of the Navy, and 87 per cent of the Air Force physicians replying

were of the opinion that the assignment was almost completely, or partially but satisfactorily, in line with training and experience. In regard to the next longest assignment, the percentages were 67, 76, and 78 per cent, respectively, for the favorable opinions of Army, Navy, and Air Force physicians.

Consistent with this evaluation, the majority also expressed satisfaction with the same assignments. A greater proportion of the Air Force (83 per cent) and Army physicians (80 per cent) expressed satisfaction (very satisfied and fairly satisfied) concerning their longest assignment than did the Navy physicians (71 per cent), while more in the latter group (79 per cent) were satisfied with their next longest assignment than were the Army (74 per cent) and Air Force (75 per cent) physicians. However, a considerably greater proportion of Army physicians (52 per cent) were very satisfied with their longest assignment than were Navy (36 per cent) and Air Force physicians (45 per cent). A greater proportion of Army (46 per cent) and Navy physicians (44 per cent) were very satisfied with their next longest assignment than were Air Force physicians (37 per cent).

Types of Patients Treated. One of the questions was designed to determine the percentage of time devoted by physicians to military personnel, dependents of military personnel, and administrative duties, both at domestic and overseas stations. On assignments in the United States nearly 42 per cent of the reporting physicians devoted one half or more of their time to the treatment of military personnel, while nearly 44 per cent devoted one half or more of their time to the treatment of dependents of military personnel. At overseas stations nearly 26 per cent of the physicians replying devoted one half or more of their time to military personnel and 13 per cent devoted one half or more of their time to dependents of military personnel.

Types of Nonmilitary Medical Care Provided. The question that was designed to determine the types of medical duties most frequently performed for nonmilitary persons elicited the information that in all three of the armed services outpatient care ranked first at domestic and overseas stations. In the Army, surgery ranked second at both domestic and overseas stations. In the Navy, pediatrics was second at domestic and overseas installations. General medical and hospital care was second for Air Force physicians both in the United States and at overseas bases.

Medical Care of Dependents by Civilian Medical Personnel. With respect to service in the United States, the majority of responding physicians were of the opinion that all medical care of nonmilitary persons could have been adequately performed by civilian military personnel. In the three military services, 582 of 930 physicians (63 per cent) so responded, However, in regard to overseas service, only 100 of 393 physicians (25 per cent) were of that opinion. In fact, 140 of 393 physicians (nearly 36 per cent), stated that none of the medical care of nonmilitary persons

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at overseas stations could have been adequately performed by civilian medical personnel.

The concluding part of this report will appear in next month's issue of the *U. S. Armed Forces Medical Journal.*

REFERENCE

1. Message from the A. M. A. *U. S. Armed Forces M. J.* 9: 597-599, Apr. 1958.

Officers Certified by Specialty Boards

The Surgeons General of the military medical services have announced that the following regular Medical Corps officers have been certified by the specialty boards indicated.

American Board of Psychiatry and Neurology

Psychiatry

Livingstone, Bruce L., Maj., USA

American Board of Radiology

Glover, Ronald W., Lt., USN

Nuclear Medicine

Pischnotte, William O., Lt., USN

American Board of Internal Medicine

Walter, Herbert L., Cdr., USN

American Board of Pathology

McHenry, Jr., Laudie E., Lt., USN

American Board of Otolaryngology

Eastwood, Herbert K., Maj., USAF

Hamilton, Alfred, Lt. Col., USA

American Board of Surgery

Nelson, Thomas G., Maj., USA
Reams, Gerald B., Capt., USAF
Snyder, William A., Lt. Comdr., USN
Terrill, Arthur A., Lt. Col., USA
Weigel, Arthur E., Maj., USAF

Thoracic Surgery

Mason, Roscoe E., Maj., USA

Swindell, Herbert V., Maj., USAF

American Board of Neurological Surgery

Crue, Jr., Benjamin L. Lt. Comdr., USN

Book Reviews

FIFTH ANNUAL REPORT OF THE USAF MEDICAL SERVICE, 1 July 1956-30 June 1957. Prepared by the Office of the Surgeon General. *United States Air Force*, Washington, D. C. 474 pages. U. S. Government Printing Office, Washington, D. C., publishers, 1958

The most striking impression given to the reader of this report is that the geographic area covered by Air Force activities is not only the entire world but outside the earth. It is geographic and almost astronomical, as well, for space medicine now occupies a place in the plans of the Air Force. The first part of the report covers the organization for the direction planning and hospitalization, personnel, education and training, dental and veterinary services. Lest some become facetious regarding flying horses or friendship with Pegasus, it may be said that a function of the Veterinary Service is to inspect foods—a most important matter for the health and efficiency of troops. The second part covers the work of the various major commands of the Air Force, five of them beyond the seas. The size and importance of the tasks of these commands can be measured by just one instance—the fact that the Air Training Command alone operates 40 fixed hospitals and dispensaries, four of the former having from 300 to 1,000 beds. Biostatistics, the third major division of the report, has the largest number of tables and charts and covers not only diseases and deaths but such subjects as the dermographic characteristics of personnel; utilization offacilities; removal from flying status; and transfer of patients between hospitals. The morbidity tables show that accidents are the principal cause of noneffective days, with mental and personality disorders second in importance. Diseases of the respiratory system caused over 10 per cent of total noneffective days, but 23 per cent of admissions. The entire book is well written and represents a valuable compend of information that answers the needs of military men, legislators, historians, and the general public—*LOUIS H. RODDIS, MC, USN (ret.)*

THE HEALING OF WOUNDS, A Symposium on Recent Trends and Studies, edited by *Martin B. Williamson,* Ph.D. 202 pages; illustrated. The Blakiston Division, McGraw-Hill Book Co., Inc., New York, N.Y., 1957. Price $7.

Twelve authors contribute to this symposium on recent trends in and studies of wound healing since World War II when methods such as the electrophoretic technic for determining the various fractions of proteins have become available to laboratories. The first eight chapters are concerned with results derived primarily from animal experimentation. In the section on metabolism of proteins and amino acids it is emphasized that details of changes in plasma protein fractions vary from different laboratories, and these changes appear relatively nonspecific. The most significant result from these studies was that there is a negative nitrogen balance in injured animals, and that the requirement for

this deficiency can be partially supplied by dietary cystine and methionine. A chapter is devoted to emphasizing the existence of a nonfibrillar "ground substance" as a clear-cut biochemical entity of major importance in wound healing, and the role of methionine is again brought out in the section derived from research on protein-starved animals. The remaining chapters dealing with sulphur compounds, vitamin C, hormones, collagen, and muscle healing all throw light on the complex process of wound healing. The final two chapters, written specifically for the clinician, deal with incisions used in gynecology and the importance of the recent biochemical studies on the clinical approaches to the concepts of wound healing. There is a rather complete bibliography for each phase of the subject covered. This book is of particular interest to one desiring additional theoretical or experimental details.

—*EMMETT F. NORWOOD, Capt., MC, USN*

REHABILITATION MEDICINE. A Textbook on Physical Medicine and Rehabilitation, by *Howard A. Rusk,* M.D., and *36 collaborators,* with editorial assistance of *Eugene J. Taylor,* A.M. 572 pages; illustrated. The C. V. Mosby Company, St. Louis, Mo., 1958. Price $12.

This is a valuable contribution to the increasing literature of physical medicine and rehabilitation. It is intended to serve as a "basic elementary textbook" and as a "useful reference for all physicians, whether they be in general practice or specializing in rehabilitation and physical medicine."

The text is divided into two parts. The first consists of 15 chapters devoted to principles of rehabilitation medicine beginning with the philosophy and need for rehabilitation. They include an excellent and detailed presentation of the process of the evaluation of the patient, and completion of the history, examination of the neuromuscular and locomotor systems, testing in activities of daily living, and psychological and vocational testing. Descriptions are also given of special therapeutic methods and technics and the use of wheel chairs, crutches, braces, splints, and self-help devices. Individual chapters are devoted to the training of the disabled homemaker, the management of psychiatric, speech, social, and vocational problems. The second half of the book describes the application of the principles or rehabilitation medicine to the severe disabilities such as paraplegia, quadriplegia, hemiplegia and to a wide variety of other diseases and disorders of the pulmonary, cardiovascular, neuromuscular and locomotor systems, many of which do not necessarily require extensive rehabilitation facilities. Pediatric and geriatric problems are also considered. This volume is well organized, clearly written and illustrated with useful charts and photographs. It is an authoritative presentation of current concepts and trends in physical medicine and rehabilitation, and undoubtedly will take its place as a standard reference in physical medicine and rehabilitation. It should be read by every physiatrist, and it is recommended as a valuable reference for all physicians and ancillary medical personnel. —*ANIELLO F. MASTELLONE, Lt. Col., MC, USA*

THE CERVICAL SYNDROME, by *Ruth Jackson,* M. D., F. A. C. S.; Second edition; 197 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1958. Price $6.50.

What must otherwise be gleaned piecemeal from many sources concerning disorders of cervical spine origin has been wrapped up neatly in this compact little volume. A long-time writer and lecturer on this subject, Dr. Jackson has justified her reputation as a careful analyst of the minute details of aberrations from the normal cervical spine anatomy and function and their direct relationships to the production of symptom syndromes. The normal anatomic structures of the cervical spine and their intimate interrelationships are given in great detail and this writer has nowhere seen better drawings and x-ray reproductions to illustrate the explanations of the text. Similar excellent pictorial support is given the text explanations of the mechanism of cervical nerve root irritation, the etiologic factors in symptomatology and the fine points of diagnosis and differential diagnosis. The author's methods of treatment follow logically from her explanations of cause and effect. For those, like this writer, who have been confused by the lack of knowledge of basic anatomic and pathologic facts concerning the cervical spine, and their mechanistic relationship to symptom syndromes, this well-written text should prove of great value.

—*JOHN D. BLAIR, Col., MC, USA*

BASIC CLINICAL PARASITOLOGY, by *David L. Belding,* M.D. 469 pages; illustrated. Appleton-Century-Crofts, Inc., New York, N.Y., 1958. Price $9.50.

This book is a condensation of the author's *"Textbook of Clinical Parasitology"* and suffers the occupational disease common to condensations: clarity is occasionally sacrificed in the author's desire to include more points than are needed by the medical students and practitioners for whom the book is intended. It would appear better, for example, to omit entirely discussions of the metabolism of the individual microparasites than to give them such hasty coverage. Despite this difficulty, the book contains a wealth of information about the more common parasites and many of the less common ones that only occasionally attack man. Much of the material is assembled in easy-to-study charts and tables. Technical diagnostic measures and keys to therapy are organized into separate chapters for ease of access. The illustrations are taken from drawings rather than photographs and are easy to interpret. The chapters on parasitic insects are particularly well organized. For the busy physician, or the student who is being introduced to the subject, this will prove a useful text.

—*JOSEPH W. COOCH, Lt. Col., MC, USA*

THE MANAGEMENT OF EMERGENCIES IN THORACIC SURGERY, by *John Borrie,* M.B.E., Ch.M., F.R.C.S. (Eng.), F.R.A.C.S. Foreword by Sir *Russell Brock.* 340 pages; illustrated. Appleton-Century-Crofts, Inc., New York, N.Y., 1958. Price $10.

This book is divided into a section on general thoracic surgical procedures, followed by regional pathologic sections on chest wall, pleural, pulmonary, esophageal, mediastinal, diaphragmatic and cardiac emergen-

cies. The planning, indexing, concise categorization and frequent outline form presentation make it an easy, ready, rapid reference. The student of thoracic surgery will find covered concisely many procedures used in his everyday practice of both pre- and postoperative care. In addition to procedure descriptions, there is a wealth of information on the innumerable extremely important details of operating room and daily ward care of the thoracic surgical patient. The basic diagnostic, surgical and postoperative care is concisely and succinctly outlined and explained. There are numerous excellent x-ray, photographic, and diagrammatic illustrations, and they are so designed and placed as to clarify the well written text. This is a highly recommended book for the thoracic surgeon, both resident and senior. It is a tremendously useful work also for the general practitioner who may be faced with thoracic emergencies, and as a text for nurses and technicians who work with surgical patients. —*FELIX P. BALLENGER, Capt., MC, USN*

PATHOPHYSIOLOGY IN SURGERY, by *James D. Hardy,* M.S., (Chem.), M.D., F.A.C.S. 704 pages; illustrated. The Williams & Wilkins Company, Baltimore, Md., 1958. Price $19.

Pathology and physiology are usually dry subjects for the average clinician. The author of this book stimulates reader interest by applying related case studies to the material being presented. In addition, other related basic sciences are fitted into the puzzle when indicated. There are sections, detailed and comprehensive, on almost every organ and system in the body, which are presented in a clear, logical manner, easily understood by the clinician. The author emphasizes the fundamental unity of the human organism which is achieved through three major co-ordinators: the nervous system, the circulatory system, and the endocrine system. The chapter on multiple injuries stresses the importance of handling such injuries in the order of "physiological urgency," the two most important of which are the maintenance of adequate respiration and circulation, a consideration too often neglected by the specialist. The chapter on the respiratory system considers the heart and lungs as a single organ, as they should be. The chapter on the circulatory system gives the normal pressures found in various parts of the circulatory system, and cautions against overloading of the surgical patient with fluids and the subsequent development of a pulmonary edema. Some readers will disagree with the author's statement that the Evans blue dye method for determining blood volume is as accurate as most other methods.

This book could well have been called "Pathophysiology" rather than "Surgical Pathophysiology" because it invades the fields of the surgeon, internist, pathologist, physiologist, and most of the specialty fields dealing with systemic disease. The author has made good his attempt to fuse "medical" and "surgical" physiology. The references are adequate, and there are 278 photographs and diagrams, all contributing to the lucidity of the subject matter. This outstanding book is highly recommended for all clinicians dealing with systemic disease, and, in particular, for the general surgeon.

—*SANFORD W. FRENCH, III, Col., MC, USA*

COLD INJURY. Transactions of the Fifth Conference, March 10 through 15, 1957. Editor: *M. Irene Ferrer*, M. D. Sponsored by The Josiah Macy, Jr. Foundation, New York, New York. The Josiah Macy, Jr. Foundation, New York, N. Y., Price $5.95.

This text reports the results of a conference on cold injury at the Arctic Aeromedical Laboratory, Ladd Air Force Base, Alaska. It covers a number of investigative endeavors concerning various physiologic responses in animals and man to cold exposure. The subject matter includes animal and human adaptation to cold, hibernation, ventricular fibrillation in hypothermia, use of glycine in hypothermia, energy metabolism in cold and avenues of heat loss and peripheral circulation during cold exposure. In the last presentation the use of hypnosis in cold experimentation is discussed at considerable length. It is written in unique style. Experts in their various specialties report their experimental observations during or after which the other panel participants either ask questions or add information of their own. This leads to a certain amount of break in continuity of thought and the introduction of some extraneous material. The technical data presented are excellent and are tied together in a single volume with good references. Students of this complicated subject will find it an outstanding source of information.—*ROBERT B. LEWIS, Col., USAF (MC)*

THE YEAR BOOK OF OBSTETRICS AND GYNECOLOGY, (1958-1959 Year Book Series) by *J. P. Greenhill*, B. S., M. D., F. A. C. S., F. I. C. S. (Honorary). 607 pages; illustrated. Year Book Publishers, Inc., Chicago, Ill., 1958. Price $7.50.

This annual volume is a review of all pertinent articles in the foreign and American literature, published between September 1957 and September 1958, on all subjects of interest to the obstetrician and gynecologist. Following an abstract of each article or series of similar articles is an editor's note giving his opinion and experience on the subject. The selection of titles is representative of the thinking of leaders in both experimental and clinical medicine in this country and in all other parts of the world. Such pertinent subjects noted since World War II as the role of cytology in this specialty; studies of transfer of material across human placenta; endocrinological studies; hematologic studies on the living human ova; problems associated with abortion; surgical closure of the incompetent os during pregnancy; problems in infertility, and medical complications in pregnancy are adequately reviewed and discussed. The current interesting subject of hypofibrinogenemia in pregnancy as well as the problems associated with prolonged pregnancy and postmaturity are reviewed in several interesting articles. This is a compendium of the current world literature which every specialist in this field should have in his personal library.

—*HUMBERT L. RIVA, Col., MC, USA*

CONVULSIVE DISORDERS OF CHILDREN, by *Dora Hsi-Chih Chao*, M. D., *Ralph Druckman*, M. D., *Peter Kellaway*, M. D., Ph. D. 151 pages; illustrated. W. B. Saunders Company, Philadelphia, Pa., 1958. Price $6.

This book presents in simple, concise, and readable style a fundamental yet complete discussion of the convulsive disorders of child-

hood. It should aid in clarification of a sometimes confusing subject for the pediatrician and general practitioner. The neurologist may find the volume incomplete for his specialized needs. The introduction is followed by discussion of the basis of seizure manifestations, sequence of events in a seizure, and well-written presentations of the various forms of epilepsy, including febrile convulsions, breath-holding attacks, and epilepsy of adult life. These are followed by sections on extracerebral factors in convulsions, the investigation of seizure patients, electroencephalography in the diagnosis and management of the epilepsies, and a complete presentation of the management of seizures including drug therapy, psychological and surgical factors, and genetic influences. A complete drug table listing 15 drugs with indications, dosage, toxicity, and preparations of each available should prove of value to the clinician. Illustrative case presentations and electroencephalographic tracings are well integrated with the text. The reviewer found the volume lacking only in that the ketogenic diet was presented very briefly and superficially. The emphasis is primarily clinical but pathology and physiology are discussed when pertinent. The chapter on electroencephalography is of particular interest because the average clinician often does not realize the limitations and difficulties encountered by both technician and interpreter. This volume should fill a need for the practicing physician who desires a complete yet concise and simply written reference book for the convulsive disorders of childhood.

—FREDERICK C. BIEHUSEN, Maj., MC, USA

THE CHEMICAL PREVENTION OF CARDIAC NECROSES, by *Hans Selye*, M. D., Ph. D., D. Sc. 235 pages; illustrated. The Ronald Press Company, New York, N. Y., 1958. Price $7.50.

As noted in the preface, cardiac necrosis is the most common cause of death in man, yet the cause, clinical course and morphologic characteristics of the various cardiac necroses are vastly dissimilar. In the author's ever-growing work on stress and adaptation, he has been impressed by the frequent finding of cardiac necrosis in experimental animals. He found that the administration of various corticoids and certain sodium salts, except sodium chloride, would produce a fatal cardiac necrosis and myocarditis which could be prevented by the prophylactic administration of magnesium chloride or potassium chloride. Although much experimental data are presented concerning the electrolyte-steroid-cardiopathies, one must be cautious in the transposition of such information to human use. Seeking a common pathogenesis for cardiac necrosis is laudatory but could hardly yield a single mechanism because, in the light of our existing knowledge, several established means are well recognized and substantiated. The book itself serves to assemble data regarding the experimental production of cardiac necrosis and therefore has only limited usefulness. It should benefit those working in the field of stress and experimental cardiology but one wonders why it was found necessary to publish the work in book form.— *VERNIE A. STEMBRIDGE, Major, USAF (MC)*

CIBA FOUNDATION COLLOQUIA ON AGEING, Volume 4 - Water and Electrolyte Metabolism in Relation to Age and Sex. Editors for the Ciba Foundation: *G. E. W. Wolstenholme,* O.B.E., M.A., M.B., B.Ch., and *Maeve O'Connor,* B.A. 327 pages; with 85 illustrations. Little, Brown & Company, Boston, Mass., 1958. Price $8.50.

This colloquium was labeled with a sweeping title; however, the tenor and purpose of the meeting was the exchange and recording of ideas in areas of endocrinology and nephrology with particular consideration on the parameter of aging as it alters the physiology of these hemeostatic mechanisms. The book documents the formal papers of 27 medical scientists from nine countries. Three papers, "Age and Renal Disease," "Water and Electrolyte Metabolism in Congestive Failure," and "Role of Kidney in Electrolyte and Water Regulation in the Aged" are recommended to clinicians and medical researchers alike for their clarity of presentation of altered physiology and for their succinct discussion of the medical philosophy of aging anent the kidney. The discussions following each paper are the bright points of the publication. Only imagination can conjure the nuances of lively repartee that efficient editorialization has sterilized from the printed page and denied the reader. The book is designed for large medical libraries and for bibliographic reference.—*EDWARD J. HUYCKE, Capt., MC, USA*

PICTORIAL HANDBOOK OF FRACTURE TREATMENT, by *Edward L. Compere,* M.D., F.A.C.S., *Sam W. Banks,* M.D., F.A.C.S., *Clinton L. Compere,* M.D., F.A.C.S. 4th edition. 448 pages; illustrated. The Year Book Publishers, Inc., Chicago, Ill., 1958. Price $7.50.

In the current edition of this book new technics for the treatment of Colles' fractures by skeletal traction have been added, the problem of aseptic necrosis of the head of the femur and the carpal navicular has received additional consideration, and chapters on fracture healing, aseptic necrosis, and fractures of the spine have been rewritten. The presentation of the material is concise, clear, and to the point, as is to be expected from the practical experience and scientific standing of the authors. The great popularity of the book lies in its appeal to the young practitioner who, without special training, is confronted with orthopedic problems. It provides ready reference for any condition that may arise in the field. The many excellent illustrations perform a great service to students and practitioners not specially trained in orthopedic surgery.—*ERNST DEHNE, Col., MC, USA*

TUMORS AND TUMOROUS CONDITIONS OF THE BONES AND JOINTS, by *Henry L. Jaffe,* M.D. 629 pages. 701 illustrations on 194 figures. Lea & Febiger, Philadelphia, Pa., 1958. Price $18.50.

This book has been written by an authority of long standing with an extremely wide experience with lesions of the bones. He has treated the subject most comprehensively. The text is divided into 33 chapters, each of which takes up a single or a group of closely related lesions. Each chapter begins with a general discussion of the tumor in question and is then followed in order by sections on clinical considerations, radiographic findings, pathologic findings, differential diagnosis and treatment. Well chosen and important references are given at the end of

each chapter. In those instances where the author's interpretations differ from those of other pathologists the various opinions are discussed and references to the work of others included. The volume is profusely illustrated by excellent radiographs, and gross and microscopic photographs. The author's experience, the exhaustiveness of his coverage, and his clear and readily comprehended style of writing make this work a classic in a highly complex field of tumors. It brings together in proper relationship the clinical, radiologic and pathologic considerations so necessary to the evaluation and understanding of bone tumors. It should be considered a "must" for every physician dealing with lesions of the skeletal system, not only as a reference, but also for reading from cover to cover.—*HOWARD A. VAN AUKEN, Col., MC, USA*

PHYSIOLOGICAL BASES OF PSYCHIATRY. Compiled and edited by *W. Horsley Gantt,* M.D. 344 pages; illustrated. Charles C. Thomas, Publisher, Springfield, Ill., 1958. Price $10.50.

This book contains all but one of the articles presented at the 25th anniversary of the Pavlovian Laboratory in Baltimore in May 1955 when the Pavlovian Society was founded, some of the reports from the first meeting of the Society at the Behavior Farm Laboratory of Cornell University in May 1956, and a complete list of its publications. Nearly 300 articles, reviews, and books are listed. The book has no real plan; it is not a reference book nor even a complete survey of an experimental field. Many of the technical articles have to do with conditional reflex studies in animals, but not all of them *(e.g.,* a report on autonomic responses to mecholyl and epinephrine in schizophrenic patients). Some of the papers are nontechnical and some are heavily laden with theory. Authors include such varied personalities as Ernst Gellhorn, who contributes a definition of objective psychiatry, John Dos Passos, who discusses objective description, and Edward Kempf's "The Conflicting Conditioned, Self-Determining Attitude–Basic Mechanism of Neuroses." The book is difficult to read despite some lucid and interesting passages. Much of this is due to language inventions and abbreviations which seem to plague experimental and theoretical psychiatry (which may be only a clinician's point of view) but some of it is due to heavy style of expression. Still, one emerges from the reading of it with at least a better knowledge of the nature, interests, and capabilities of two American laboratories, a better appreciation of the scope and direction of a type of research, and even a little better knowledge of the field itself. This book can be recommended for medical libraries if not for individual acquisition.

—*WILLIAM H. ANDERSON, Lt. Col., MC, USA*

CEREBRAL VASCULAR DISEASES. Transactions of the Second Conference held under the Auspices of *The American Heart Association,* Princeton, New Jersey, January 16-18, 1957. *Irving S. Wright,* Chairman; *Clark H. Millikan,* Editor. Including a Classification and Outline of Cerebrovascular Diseases. 224 pages. Published for The American Heart Association by Grune & Stratton, Inc., New York 16, N.Y., 1958. Price $4.

This exciting account of the second conference on cerebrovascular disease does much to inspire the reader with the content and spirit of

his outstanding meeting. For three days, under one roof, 40 outstanding physicians of mixed specialities lectured and discussed this vital problem. Their papers, comments, praises, and barbs are well tabulated. Stimulating presentations on the pathology of cerebrovascular diseases were presented by Harry Fang of the University of California and Raymond D. Adams of the Massachusetts General Hospital. Other basic fundamentals were described on cerebral blood flow by Gustav Nylin of Stockholm, Sweden, and on cerebrovascular lesions by Jack P. Whisnant from the Mayo Clinic. Clinical aspects were then presented by A. C. Corcoran of Cleveland Clinic Foundation on the relationship of hypertensive disease, and on intermittent cerebral ischemia by C. Miller Fisher of Harvard Medical School. Evaluation of current approaches to the therapy of atherosclerosis was given by Jeremiah Stamler of Michael Reese Hospital in Chicago. Anticoagulant therapy was discussed by Ellen McDevitt of Cornell. These were honestly presented. A paper on studies with enzymes in treatment of thrombosis, by Eugene Clifton, of course, was provocative and revealing. A paper on the surgical aspects of intracranial aneurysms, by E. Harry Botterell of University of Toronto, was well done. It points out the advances of aneurysmal surgery in general but especially in his own hands. The over-all mortality of this type of surgery is certainly improving, but has far to go. With Irving S. Wright as chairman, and Clark Millikan as editor, this book is well organized. Outstanding and outspoken discussers ask, and answer most of the reader's questions, as far as it is possible to do so.

—*FRANK B. CLARE, Capt., MC, USN*

INJURIES AND SURGICAL DISEASES OF THE ISCHIUM, by *Henry Milch*, M.D. 163 pages; illustrated. Paul B. Hoeber, Inc., Medical Book Department of Harper & Brothers, New York, N.Y., 1958. Price $10.50.

This monograph of a specialized portion of the innominate bone is of orthopedic, surgical, and obstetrical interest, in decreasing order. The author gives a description of the gross and comparative anatomy of the ischium and its environs. Clinical and roentgenographic examination are discussed, with emphasis on accurate roentgen technic. The remainder of the book, which is the major portion, tells vividly of the various pathologic conditions which involve the ischium, and concludes with a chapter on surgery of the ischium. It was a novel approach for the reviewer to join the author in focusing attention on the ischium itself, and inevitably one ends up contemplating the whole rather than the part. The author speaks with authority. He has augmented the text with good illustrations, except for the section on anatomy. The increasing incidence of pelvic fractures associated with motor vehicle accidents make the chapter on fractures of the ischium most timely and important. The femoral aspect of the hip joint was not discussed. Associated gastrointestinal and genitourinary tract injuries were mentioned but not enlarged upon. The thoroughness with which central acetabular and ischio-acetabular fractures are taken up is outstanding, as is the section on surgery of the ischium. These alone make this monograph deserving of a place on the bookshelves of orthopedic and general surgeons.—*ROBERT H. BROWN, Comdr., MC, USN*

MONOGRAPHS ON NEOPLASTIC DISEASE AT VARIOUS SITES. General Editor *D. W. Smithers,* M.D., F.R.C.P., F.F.R. Volume 1, CARCINOMA OF THE LUNG, edited by *J. R. Bignall,* M.D., M.R.C.P. 298 pages; illustrated. The Williams & Wilkins Company, Baltimore, Md., 1958. Price $10.50.

This book presents a detailed coverage of carcinoma of the lung, compiled, as a co-operative hospital product of pooled data and clinical experiences, by several outstanding authorities. This approach eliminates the shortcomings attending presentations based upon limited data and scant clinical experience. The section on mortality is developed from basic data presented in well designed graphs and frequency tabulations which attract attention, stimulate reader interest, and require study for understanding. An epidemiologic perspective of the problem is developed from a consideration of environmental factors. This entire section is worthy of repeated study. The section on causation of lung cancer includes an excellent and detailed discussion of the smoking of tobacco. Therapy is handled in great detail, and in my opinion provides many thought-provoking ideas regarding the optimum use of available treatment regimens. The consideration given to personal factors in the treatment situation is most timely and commendable. The concept of total patient care in an atmosphere of personalized attention is stressed. For specialists in chest disease this book is of real value. Practitioners, more diversified in their medical work, will find sections of the monograph highly pertinent to everyday problems.

—*JAMES C. SYNER, Maj., MC, USA*

ESSENTIALS OF PEDIATRICS, by *Philip C. Jeans,* A.B., M.D.; *F. Howell Wright,* B.S., M.D.; and *Florence B. Blake,* R.N., M.A. 6th edition. 714 pages; illustrated. J. B. Lippincott Company, Philadelphia, Pa., 1958. Price $6.

Nurses must have available clinical information which can be readily obtained in an authoritative reference presented in readable form. This has been presented most capably by the authors in a revised and expanded edition. Hospital training of nurses often focuses attention on the ill child, with little or no experience gained from first-hand knowledge of the healthy child. A section devoted to the healthy child will prove stimulating to nurses surrounded by the sick. Emphasis is placed on infectious diseases at a time when many described entities are less frequently encountered in the antibiotic age than previously. However, the difficult problem of management of staphylococcus infections is lightly treated. Our nuclear age with all of its awesome advancements and apprehension-provoking achievements, both for life and health, received, in the reviewer's mind, little attention. Instructions of nurses in the problems involved in management of mass irradiation and traumatic casualties is desperately needed to meet the challenge facing our medical profession in its all-inclusive connotation, in today's world. Despite minor shortcomings, this volume will prove vitally interesting and stimulating to student nurses and instructors; and physicians should find it helpful in obtaining a fresh approach to problems which require explanation to parents.—*BEDFORD H. BERREY, Maj., MC, USA*

New Books

AVIATION MEDICINE. An Annotated Bibliography. Volume 2, 1953 Literature, by *Arnold J. Jacobius, Madeleine J. Wilkins, Ludmila Kassianoff, Rita B. Slie, Sam L. Whitehead* – Bibliography Section, Science and Technology Division, The Library of Congress. 354 pages. Published by the Aero Medical Association, 2642 University Ave., St. Paul, Minn., 1959. Price $5.

ANNUAL REPORT OF THE SURGEON GENERAL, UNITED STATES ARMY, Fiscal Year 1958. Prepared by The *Office of the Surgeon General, United States Army,* Washington, D. C. 94 pages. U. S. Government Printing Office, Washington, D. C., 1958.

FIFTH ANNUAL REPORT OF THE USAF MEDICAL SERVICE, 1 July 1956 – 30 June 1957. Prepared by The *Office of the Surgeon General, United States Air Force,* Washington, D. C. 474 pages. U. S. Government Printing Office, Washington, D. C., publishers, 1958.

THE DEMONSTRATION CLINIC, by *David M. Levy,* M. D. 120 pages. Charles C Thomas, Publisher, Springfield, Ill., 1959. Price $5.

FUNDAMENTALS OF ECOLOGY, by *Eugene P. Odum* in collaboration with *Howard T. Odum.* 2d edition. 546 pages; illustrated. W. B. Saunders Company, Philadelphia, Pa., 1959. Price $7.50.

THE CENTRAL NERVOUS SYSTEM AND BEHAVIOR, Transactions of the First Conference February 23, 24, 25, and 26, 1958, edited by *Mary A. B. Brazier,* Ph. D. Sponsored by the *Josiah Macy, Jr. Foundation,* New York, N. Y., with the cooperation of The National Science Foundation, Washington, D. C. 450 pages; illustrated. Printed by Madison Printing Company, Inc., Madison, N. J., 1958. Price $5.25.

VASCULAR SURGERY, by *Geza de Takats,* M. D., M. S., F. A. C. A., 726 pages; illustrated. W. B. Saunders Company, Philadelphia, Pa., 1959. Price $17.50.

THE ART OF LISTENING, by *Dominick A. Barbara,* M. D., F. A. P. A. 201 pages. Charles C Thomas, Publisher, Springfield, Ill., 1958. Price $5.50.

PATHOGENESIS AND TREATMENT OF PARKINSONISM, from the Sixth Annual Meeting of the Houston Neurological Society, Texas Medical Center, Houston, Tex. Compiled and edited by *William S. Fields,* M. D., with 24 contributors. 372 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1958. Price $10.75.

PRINCIPLES OF PERIPHERAL VASCULAR SURGERY, by *S. Thomas Glasser,* M. D., C. M., F. A. C. S., F. A. C. A. 410 pages; illustrated. F. A. Davis Company, Philadelphia, Pa., 1959. Price $12.50.

THE YEAR BOOK OF DRUG THERAPY (1958-1959 Year Book Series), edited by *Harry Beckman,* M. D. 569 pages. The Year Book Publishers, Inc., Chicago, Ill., 1959. Price $7.50.

PULMONARY CIRCULATION, an International Symposium, 1958, sponsored by the *Chicago Heart Association.* Edited by *Wright R. Adams,* M. D., and *Ilza Veith,* Ph. D. 316 pages; illustrated. Grune & Stratton, Inc., New York, N. Y., 1959. Price $4.50.

NEUROLOGICAL AND PSYCHOLOGICAL DEFICITS OF ASPHYXIA NEONATORUM, with Consideration of Use of Primates for Experimental Investigations, edited by *William F. Windle,* Ph. D., Sc. D., with 28 contributors. 336 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1958. Price $8.

FRACTURE SURGERY, a Textbook of Common Fractures, by *Henry Milch*, M. D., F. A. C. S., and *Robert Austin Milch*, M. D. 470 pages; illustrated. Paul B. Hoeber, Inc., New York, N. Y., 1959. Price $17.50.

FUNDAMENTALS OF INORGANIC, ORGANIC AND BIOLOGICAL CHEMISTRY, by *Joseph I. Routh*, Ph. D. 4th edition. 384 pages; illustrated. W. B. Saunders Company, Philadelphia, Pa., 1959. Price $4.

LABORATORY MANUAL OF CHEMISTRY, by *Joseph I. Routh*, Ph. D. 4th edition. 115 pages; illustrated. W. B. Saunders Company, Philadelphia, Pa., 1959. Price $1.75.

HEREDITY COUNSELING, a Symposium sponsored by the American Eugenics Society, edited by *Helen G. Hammons*. 112 pages. Paul B. Hoeber, Inc., New York, N. Y., 1959. Price $4.

REMINISCENCES AND ADVENTURE IN CIRCULATION RESEARCH, by *Carl J. Wiggers*, M. D. 404 pages; illustrated. Grune & Stratton, Inc., New York, N. Y., 1959. Price $9.75.

COLD INJURY. Transactions of the Fifth Conference, March 10 through 15, 1957. Editor: *M. Irene Ferrer*, M.D. Sponsored by The *Josiah Macy, Jr. Foundation*, New York, N.Y. The Josiah Macy Jr. Foundation, New York, N.Y., 1958. Price $5.95.

PATIENTS, PHYSICIANS AND ILLNESS. Sourcebook in Behavioral Science and Medicine, edited by *E. Gartly Jaco*. 600 pages. The Free Press, Glencoe, Ill., 1958. Price $7.50.

TEXTBOOK OF SURGERY, edited by *Guy Blackburn*, M.B.E., M.CHIR., F.R.C.S., and *Rex Lawrie*, M.D., M.S., F.R.C.S., M.R.C.P., with a foreword by Sir *Russell Brock*, M.S., F.R.C.S., F.A.C.S. (hon.). 1,122 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1958. Price $16.75.

PHYSIOLOGY OF SPINAL ANESTHESIA, by *Nicholas M. Greene*, B.S., M.A., M.D., with a foreword by *John Gillies*, C.V.O., M.C., F.R.C.P.E., F.R.C.S.E. 195 pages; illustrated. The Williams & Wilkins Company, Baltimore, Md., 1958. Price $6.

CARDIAC ARREST AND RESUSCITATION, by *Hugh E. Stephenson, Jr.*, M.D. 378 pages; illustrated. The C. V. Mosby Company, St. Louis, Mo., 1958. Price $12.

THE PSYCHOANALYTIC STUDY OF THE CHILD. Volume XIII. Managing Editors: *Ruth S. Eissler*, M.D., *Heinz Hartmann*, M.D., *Anna Freud*, LL.D., *Marianne Kris*, M.D. 573 pages. International Universities Press, Inc., New York, N.Y., 1958. Price $8.50.

THE ATOM AND THE ENERGY REVOLUTION, by *Norman Lansdell*. 200 pages; illustrated. Philosophical Library, Inc., New York, N.Y., 1958. Price $6.

BEHAVIORAL ANALYSIS; Analysis of Clinical Observations of Behavior, as Applied to Mother-Newborn Relationships, by *David M. Levy*, M. D. 370 pages. Charles C Thomas, Publisher, Springfield, Ill., 1958. Price $9.50.

PSYCHOTHERAPEUTIC DRUGS, by *Ashton L. Welsh*, M. S., M. D. 139 pages. Charles C Thomas, Publisher, Springfield, Ill., 1958. Price $4.75.

IMMUNOLOGY AND DEVELOPMENT, a Report from the Developmental Biology Conference Series, 1956, edited by *Mac V. Edds, Jr.* 57 pages. The University of Chicago Press, Chicago, Ill., 1959. Price $2.50.

CLINICAL EPIDEMIOLOGY, by *John R. Paul*, M. D., Sc. D. 290 pages; illustrated. The University of Chicago Press, Chicago, Ill., 1959. Price $5.

NURSE-PATIENT RELATIONSHIPS IN PSYCHIATRY, by *Helena Willis Render*, R. N., B. S., and *M. Olga Weiss*, R. N., M. Lit. 2d edition. 319 pages. The Blakiston Division, McGraw-Hill Book Company, Inc., New York, N. Y., 1958. Price $5.95.

THE UTERUS. Annals of the New York Academy of Sciences, Volume 75, Article 2, pages 385-1040, illustrated, January 9, 1959. Editor-in-Chief, *Otto v. St. Whitelock*. New York Academy of Sciences, New York, N. Y., 1959. Price $7.

ANNALS OF THE NEW YORK ACADEMY OF SCIENCES, Volume 76, Article 4, pages 971-1134, January 23, 1959. Editor-in-Chief: *Otto v. St. Whitelock*. "Conceptual and Methodological Problems in Psychoanalysis." 163 pages. The New York Academy of Sciences, New York, N. Y., 1959. Price $2.75.

MEDICAL DEPARTMENT, United States Army, Surgery in World War II. Neurosurgery, Volume 1. Editor-in-Chief: Colonel *John Boyd Coates, Jr.*, MC, USA. Editors for Neurosurgery: *R. Glen Spurling*, M. D., and *Barnes Woodhall*, M. D. Associate Editor: *Elizabeth M. McFetridge*, M. A. 466 pages; illustrated. Historical Unit, Army Medical Service, *Office of the Surgeon General, Department of the Army*, Washington 25, D. C., 1958. For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. Price $5.

A GUIDE TO NUCLEAR ENERGY, by *R. F. K. Belchem*, C. B., C. B. E., D. S. O. 77 pages; illustrated. Philosophical Library, Inc., New York, N. Y. Price $3.75.

RADIOACTIVITY MEASURING INSTRUMENTS, A Guide to Their Construction and Use, by *M. C. Nokes*. 75 pages; illustrated. Philosophical Library, Inc., New York, N. Y. Price $4.75.

EMERGENCY SURGERY, by *Hamilton Bailey*, F. R. C. S. (England) F. A. C. S., F. R. S. E. 7th edition. 1197 pages; illustrated. The Williams & Wilkins Company, Baltimore, Md., 1958. Price $32.50.

THE MANAGEMENT OF FRACTURES AND DISLOCATIONS, Volumes I and II, by *Anthony F. DePalma, M. D.* 906 pages; illustrated. W. B. Saunders Company, Philadelphia, Pa., 1959. Price $35 for set of two volumes.

ORGANIC CHEMISTRY, A Short Text, by *George E. Estok*, Ph. D. 275 pages; illustrated. W. B. Saunders Company, Philadelphia, Pa., 1959. Price $5.50.

PRINCIPLES OF PHYSICAL EDUCATION, by *Jesse Feiring Williams*, M. D., Sc. D. 7th edition. 389 pages. W. B. Saunders Company, Philadelphia, Pa., 1959. Price $4.50.

PRACTICAL DERMATOLOGY, by *George M. Lewis*, M. D., F. A. C. P. 2d edition. 363 pages; illustrated. W. B. Saunders Company, Philadelphia, Pa., 1959. Price $8.

PRINCIPLES OF ETHICS, by *Dom Thomas V. Moore*, M. D., Ph. D., and *Dom Gregory Stevens*, S. I. D. 5th edition. 282 pages. J. B. Lippincott Company, Philadelphia, Pa., 1959. Price $6.

AMERICAN DRUG INDEX 1959, by *Charles O. Wilson*, Ph. D., and *Tony Everett Jones*, Ph. D. 671 pages. J. B. Lippincott Company, Philadelphia, Pa., 1959. Price $5.75.

CLINICAL ORTHOPAEDICS, Number 12. Editor-in-Chief: *Anthony F. DePalma*. 327 pages; illustrated. J. B. Lippincott Company, Philadelphia, Pa., 1959. Price $7.50.

OUTLINE OF FRACTURES, Including Joint Injuries, by *John Crawford Adams*, M. D., F. R. C. S., 2d edition. 268 pages; illustrated. The Williams & Wilkins Co., Baltimore, Md. 1958. Price $6.50.

PRACTICAL BLOOD GROUPING, by *F. Stratton*, M. D., D. Sc., D. P. H., and *P. H. Renton*, M. D., B. Sc. 331 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill. 1958. Price $9.

GYNECOLOGIC RADIOGRAPHY, by *Jean Dalsace*, M. D., and *J. Garcia-Calderon*, M. D., with a chapter on Radiography of the Breast, by *Charles M. Gros*, M. D., and *Robert Sigrist*, M. D. 188 pages; illustrated. Paul B. Hoeber, Inc., New York, N. Y. 1959. Price $8.

EMBRYONIC NUTRITION, a Report from The Developmental Biology Conference Series, 1956, edited by *Dorothea Rudnik*. 113 pages; illustrated. The University of Chicago Press, Chicago, Ill., 1959. Price $3.25.

ENVIRONMENTAL INFLUENCES ON PRENATAL DEVELOPMENT, a Report from The Developmental Biology Conference Series, 1956, edited by *Beatrice Mintz*. 86 pages; illustrated. The University of Chicago Press, Chicago, Ill., 1959. Price $3.

CYTODIFFERENTIATION, a Report from the Developmental Biology Conference Series, 1956, edited by *Dorothea Rudnik*. 148 pages; illustrated. The University of Chicago Press, Chicago, Ill., 1959. Price $3.75.

INDUSTRIAL CARCINOGENS, by *R. E. Eckardt*, M. D., Ph. D., F. A. C. P. 164 pages; illustrated. Grune & Stratton, Inc., New York, N. Y., 1959. Price $6.50.

MANUAL OF DIFFERENTIAL DIAGNOSIS, by *William C. Matousek*, M. D. 352 pages. The Year Book Publishers, Inc., Chicago, Ill., 1959. Price $8.

PHYSIOLOGY OF MUSCULAR ACTIVITY, by *Peter V. Karpovitch*, M. D., M. P. E., originally by *Edward C. Schneider*, M. P. E., Ph. D., D. Sc. 5th edition. 368 pages; illustrated. W. B. Saunders Company, Philadelphia, Pa., 1959. Price $5.

DYNAMICS OF PROLIFERATING TISSUES, a Report from The Developmental Biology Conference Series, 1959, edited by *Dorothy Price*. 95 pages; illustrated. The University of Chicago Press, Chicago, Ill., 1959. Price $3.25.

THE ROOTS OF PSYCHOANALYSIS AND PSYCHOTHERAPY, by *S. A. Szurek*, M. D. 134 pages. Charles C Thomas, Publisher, Springfield, Ill., 1959. Price $4.25.

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DICTIONARY OF ASTRONOMY AND ASTRONAUTICS, by *Armand Spitz* and *Frank Gaynor*. 439 pages. Philosophical Library, Inc. New York, N. Y., 1959. Price $6.

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A COMPENDIUM OF RESEARCH AND THEORY ON STUTTERING, by *Charles F. Diehl*, Ph. D. 314 pages. Charles C Thomas, Publisher, Springfield, Ill., 1959. Price $9.75.

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